DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

13.

REPORT

ON

FOOT-AND-MOUTH DISEASE

IN IRELAND

IN THE YEAR

1912.

Presented to both Houses of Parliament by Command of His Majesty.





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To

His Excellency John Campbell, Earl of Aberdeen,

Lord Lieutenant-General and General Governor of Ireland.

May it please Your Excellency,

I am directed by the Vice-President to submit to Your Excellency a Report on Foot-and-Mouth Disease in Ireland in the year 1912.

I have the honour to remain,

Your Excellency's faithful Servant,

T. P. GILL,

Secretary.

Department of Agriculture

and Technical Instruction for Ireland,

Upper Merrion Street,

Dublin, 10*th September*, 1913.



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Dublin Castle,

18*th September*, 1913.

Sir,

I have to acknowledge the receipt of your letter of the 10th instant, forwarding for submission to His Excellency the Lord Lieutenant, a Report on Foot and Mouth Disease in Ireland in the year 1912.

I am,

Sir,

Your obedient Servant,

E. O'FARRELL.

The Secretary,

Department of Agriculture

and Technical Instruction,

Dublin.

Department of Agriculture and Technical Instruction for Ireland.

REPORT ON FOOT-AND-MOUTH DISEASE IN IRELAND IN 1912.

The outbreak of foot-and-mouth disease in Ireland in 1912 was an event of such an outstanding character that the Department have thought it expedient to publish in a separate form a record of the several appearances of the disease and of the transactions therewith connected. The usual annual report of the Department's proceedings under the Diseases of Animals Acts therefore treats of this matter only in a very brief form, and the full record is contained in this special report.

Ireland's Long Immunity.

Until the end of June, 1912, Ireland had been wholly free from foot-and-mouth disease for more than 28 years. During all that time of immunity in Ireland the disease had raged on the Continent, and recurrent attacks had occurred in Great Britain. Its last previous appearance in Ireland was in 1883 and 1884, when the outbreaks spread rapidly to twenty counties, and more than fifteen months passed before the disease was exterminated. During that period 3,541 separate outbreaks were recorded, and the number of animals affected reached the enormous total of 115,641.

On all occasions of outbreaks in Great Britain measures of precaution were taken by the Department to prevent the introduction of the disease into Ireland. These measures included the stoppage for the time being of the importation into this country from Great Britain of cattle, sheep, goats and other ruminating animals, and swine, the disinfection on arrival in Ireland of dealers and drovers coming from British markets, and, in recent years, the temporary prohibition of the landing of hay and straw for use as litter or fodder for animals. The success of this precautionary action is attested by the fact that in none of these cases, though of frequent happening, was the infection carried into Ireland.

In circumstances of so long duration it was natural that such an event as the appearance of foot-and-mouth disease in Ireland should be entirely unthought of by the public, and that the sudden intelligence of the discovery of the disease at Swords on the 30th June should cause surprise and consternation throughout the large community concerned with trading in, and breeding, live stock.

The First Outbreak at Swords.

Late on the evening of the 27th June, 1912, the Department received information by telegram from the Board of Agriculture and Fisheries that typical symptoms of foot-and-mouth disease had been discovered on the tongues of animals slaughtered at the Liverpool abattoirs, and that the animals concerned were probably of Irish or Scottish origin. The Department immediately instructed one of their veterinary inspectors, who was at the time in Glasgow, to proceed to Liverpool to co-operate with the officers of the English Board in tracing the origin of these animals. On the following day the Department were apprised that the existence of foot-and-mouth disease in the slaughtered cattle at Liverpool had been confirmed by the British Board's Chief Veterinary Officer, and that these cattle had been sold in Stanley Market on the 24th June, by a Dublin dealer, whose name was given. The Board forthwith issued an order entirely prohibiting the landing in Great Britain of cattle, sheep, goats and swine brought from Ireland.

Cargoes of cattle which had prior to the issue of the Board's order left for Glasgow, Heysham, and Holyhead, were forced to return to Ireland, and were, by the Department's instructions, detained for some time under observation at Dublin, Belfast, and Londonderry, in order to determine that they had not contracted disease at the British ports.

On Saturday, 29th June, the Department's then Superintending Transit Inspector, Mr. Prentice, also went to Liverpool to take part in the investigations there. On the same day a telegram was received from the Board of Agriculture and Fisheries giving some particulars as to the cargo in which the affected animals were found. The shipper of the cattle and his partner were summoned to the offices of the Department, and in the presence of the Vice-President and Secretary an inquisition took place into the origin of all the cattle shipped by them on that occasion. Particulars on this point were obtained. The cattle had been shipped from North Wall, Dublin, to Holyhead, on the s.s. "Slieve Bloom," on 20th June. Veterinary inspectors of the Department were at once despatched by motor to the different places in the country where the cattle concerned had been bought. According as particulars regarding the shipment were obtained, they were telegraphed to the Board of Agriculture. All the animals at these places were examined for disease by the inspectors. Of the cargo in question seven head of cattle had been purchased from the Misses Russell Cruise, of Drynam House, Swords, County Dublin. On Sunday, 30th June, one of the Department's Veterinary inspectors inspected the animals on the Misses Cruise's farm, and found four of them showing symptoms which he considered suspicious of foot-and-mouth disease. Mr. Hedley, the late Chief Veterinary Inspector, proceeded to Swords and confirmed the existence of the disease in these four animals and in twenty-



Disinfecting before leaving an infected place.



Disinfecting—the Sulphur Bath.

four others. The complete isolation of all the animals on the infected farm was promptly secured, and arrangements made for their slaughter.

On the same day an Order of the Department was made prohibiting the movement of all cattle, sheep, goats or swine into, out of, or within a scheduled district comprising the City and County of Dublin and the adjoining Counties of Meath, Kildare, and Wicklow. This Order came into force on Monday, 1st July. Necessary instructions were drawn up and issued to the Royal Irish Constabulary, the Dublin Metropolitan Police and the Department's veterinary staff.

It should be mentioned that some animals on the Misses Cruise's farm had been under treatment since the 15th June by a local "cow-doctor," who is not a Veterinary Surgeon, and who had been called in by the herd. This man had mistakenly treated the animals for an affection commonly known as "timber-tongue."

The work of visiting the original homesteads of all the other animals which formed the cargo of the s.s. "Slieve Bloom" on the 20th June, as well as of those comprised in a further shipment in the same vessel on the 22nd June, was speedily completed. Veterinary examination of the animals on these several places did not discover any signs of foot-and-mouth disease.

Measures were taken immediately to guard against the spread of the disease from the infected locality. The assistance of the Royal Irish Constabulary was sought, and was freely accorded by the Inspector General, with the concurrence of the Under Secretary to the Lord Lieutenant. A rigid guard of police was maintained round the farm on which the outbreak occurred, with the object of preventing all movements of persons or animals which would be likely to spread infection, and this farm was, by an Order of the Department, declared an "infected place" and made subject to the restrictions (to be described later) which apply to such places. In consequence of this outbreak 54 diseased cattle in all were slaughtered, and 76 cattle and two pigs were also slaughtered, not as being diseased, but as having been in contact with diseased animals, and thereby exposed to infection.

The steamship "Slieve Bloom" on which the diseased animals had travelled, was thoroughly disinfected with carbolic acid and re-painted.

Immediately on the occurrence of the first outbreak the Department despatched to Swords all the available members of their staff of veterinary inspectors. At the same time the entire staff of the Veterinary Branch, wherever stationed, were notified that they might be required immediately to take up duty in connection with foot-and-mouth disease, and all officers on leave of absence were recalled. The staff was strengthened by the temporary employment of additional

veterinary surgeons. The number of extra temporary inspectors eventually reaehed thirty.

Further Outbreaks at Swords.

On the 1st July two further outbrcaks were eonfirmed on thc demesne situated at Miltonfields, Swords, close to the scene of the first outbreak. On the 2nd, 4th, and 5th July, five further outbreaks occurred in the same vicinity. Between the 8th and 22nd July eight outbreaks took plaec, and another (the final outbreak in this district) oecurred on 14th August. The total number of outbreaks in the Swords district was, therefore, seventeen. The number of animals found discased on the several farms at Swords where foot-and-mouth disease occurred was 208 cattle and 1 sheep. The total number of animals slaughtered—ineluding those diseased and those exposed to infeetion—was 1,006 eattle, 881 sheep, 26 swine and 15 goats.

On the 18th July the restrietions on all movements of cattle, sheep, goats and swine, applying to Dublin and the adjoining counties, were modified so as to exeludc Counties Wicklow and Kildare and the parts of County Meath lying to the north and west of the railway lines from Drogheda to Navan and from Navan to Kilcock.

As an additional measure of seeurity the Department prohibited by Order the movement of hay or straw out of, or within, five eleetoral divisions at and around Swords.

The Department's Combative Measures.

It will be convenient to deseribe here in detail the measures taken by the Department for combating the disease at Swords and in other loealities where it appeared later. The measures now to be described, ineluding those which partieularly relate to the Swords area, were, with neeessary modifications, common to all the affected loealities, and will therefore indicate the Department's general lines of aetion in this matter.

The Scheduled Districts.

First, as regards the seheduled districts. As soon as the existenee of foot-and-mouth disease at Swords was definitely known, the Department, as already mentioned, issued an Order whieh created a large scheduled distriet, comprising thc City and County of Dublin and the bordering Counties of Meath, Kildare, and Wicklow. "Stand-still" restrictions were imposed on this seheduled district. The Order forbadc the movement of any eattle, sheep, goats or swine into the district or out of it. It also prohibited the movement of any cattle, sheep, goats or swine, along, over, or across, any highway or thoroughfare within the scheduled district, or their being allowed by the owner or person in charge of them to stray upon a highway or thoroughfarc within thc district. This drastie

prohibition formed a very effective embargo on all movements of animals which would be likely to spread the disease.

The Department, however, in scheduling such districts reserved to themselves, by a provision in their Orders, the right to permit exceptions to the general prohibition in special cases. Licences for movements prohibited by the Orders were granted by the Department in exceptional cases of undoubted necessity, and when the Department were satisfied that no danger of conveying infection would arise from the movements. No animals were in any circumstances licensed to be moved into, from, or within, a scheduled district, except after careful veterinary inspection, and the movements were in nearly all instances conducted under police supervision. The number of animals allowed to be moved in this fashion was of course comparatively very small.

When, after a short period, the scheduled district comprising the four counties mentioned was reduced somewhat in extent, the Department, as an additional precautionary proceeding, prohibited the slaughter of animals and the movement of carcases within the district, unless a licence for the slaughter or movement had been granted by an inspector or other officer authorised by the Department for the purpose. But this particular prohibition was not enforced in connection with the majority of the subsequent outbreaks of the disease which occurred in other parts of the country.

The Fifteen Miles Radius of Scheduled Districts.

In the cases of the later outbreaks also the scheduled districts were of smaller proportions than at first. The extent of country—four counties—scheduled on the occurrence of the first outbreak at Swords was unusually large. The Department at that time had strong hopes that the disease might be confined within the Swords area, and they accordingly did not hesitate to proclaim a very extensive district, so as to shut off the affected locality as completely as possible from the rest of Ireland. But it became evident once the disease had ceased to be confined to a single district and become sporadic, that it would not be practicable to maintain so large areas under restriction. In nearly all the later cases, accordingly, districts having a radius of about fifteen miles from the seats of disease were scheduled. The radius of fifteen miles, it may be mentioned, is that fixed by the British Board of Agriculture in the first instance on the occurrence of an outbreak in Great Britain.

It was obviously impossible to fix the fifteen miles limit with uniform exactness. For the purpose of definition and that the borders of a scheduled district might be precisely known by the people and the Constabulary, natural boundaries must needs be followed, such as rivers or main roads, or the dividing lines of rural districts or electoral divisions. Individual farmers and land owners frequently complained of the alleged

injustiee of their premises or lands being under restriction, while other places somewhat nearer to the seat of disease were free. But it will be seen that in the eireumstanees now referred to it was idle to demand mathematieal preeision in this matter of boundaries, and that the outer limits of the seheduled distriets must inevitably have varied in distanee by a mile or two at different points from the infeeted plaee or plaees.

The boundaries of scheduled distriets formed the outer limits to which movement restrictions eonsequent on the outbreaks applied. But within these seheduled distriets there were two smaller areas which were still more elosely restrieted.

The Hay and Straw Movement Prohibited Areas.

The first of these were the prohibited areas as regards which not only movements of animals, but movements of hay and straw, were debarred by Order of the Department. The Department's Orders dealing with these areas required that no hay or straw should be moved out of the areas, or be moved along, over, or aeross a highway or thoroughfare within the areas, exeept when a lieenee for sueh movement had been granted by an inspeetor of the Department or other authorised offieer. The prohibited area in the Swords distriet embraeed a wide region, eovering five eleetoral divisions. But in other eases the areas generally extended only from about three to five miles from the infeeted farms or premises. These areas were kept under speeially rigid supervision by the Department's inspectors and the poliee. And when, in proeess of time, the favourable eourse of events rendered praetieable the removal of restrietions from the major part of the seheduled distriet, the prohibited areas were exeepted, and eontinued under movement restrietions for some weeks longer.

The Infected Places.

The innermost areas, whieh were subjeet to the severest restrietions of all, were the infeeted plaees.

On the eonfirmation of an outbreak of foot-and-mouth disease, the premises or lands on which the outbreak had taken plaee were immediately, by order of the Department, deelared to be an "infeeted plaee." The regulations whieh apply to an infeeted place are very stringent. No animal may be moved into or out of the infeeted plaee, unless a lieenee for the movement be granted by an inspeetor of the Department or other authorised officer. The eareases of animals may not be removed from the infected plaee without written permission of an inspeetor or other authorised offieer, and likewise, fodder, litter, dung, utensils, pens, hurdles, ete., may not be taken from the plaee without sueh permission, whieh is not in any ease granted until the things to be moved have been thoroughly disinfeeted. No person (exeept the person tending the animal) is allowed, unless speeially authorised, to enter any shed, field, or other

part of an infected place in which a diseased or suspected animal is or has recently been kept; and any person permitted to enter any such field, shed, or other place, must, upon leaving it, thoroughly wash his hands with soap and water and disinfect his boots and clothes. A person tending a diseased or suspected animal is prohibited, except with special permission, from tending any other animal which is not diseased or suspected.

In the course of the disease at Swords, seventeen infected places were declared, and strict compliance with the regulations affecting these places was enforced. Further, the owners of ruminant animals or swine adjacent to the infected places were served with notices requiring them to stop all movements of their animals.

The Duration of the Restrictions.

The duration of the restrictions on these several areas naturally varied somewhat with the particular circumstances of each district. But, speaking generally, the scheduled districts remained intact for nine or ten weeks, the prohibited areas were maintained for periods varying from two to six weeks longer, according to the circumstances, and the infected places—the last to be set free—continued under regulations for three months from the date of the outbreak.

The Police Cordon.

As already mentioned, the necessary protective and precautionary measures were carried out through the agency of the Royal Irish Constabulary. A body of police—*a cordon sanitaire*—in constant touch with each other, and for the most part provided with bicycles, kept close and incessant guard round the neighbourhood of the infected places. So strict was the watch kept by the police that an observer of their patrol could not fail to recognise how difficult it would be for any unauthorised person or any animals to pass into or out of the forbidden area without instant detection.

The House-to-House Inspection.

A number of the veterinary inspectors who had proceeded to Swords promptly began a diligent house-to-house and farm-to-farm inspection of all animals in the vicinity. This was carried out most thoroughly, the area of inspection being daily widened, and it resulted in the discovery by the inspectors of cases of foot-and-mouth disease on several farms in the district.

This form of local inspection was carried through at all places where foot-and-mouth disease broke out. All animals inspected were carefully "mouthed," (*i.e.*, their tongues, palates and lips were critically examined for symptoms of the disease) and a record was made of the numbers and kinds of animals on the various farms, in view of the possibility of surreptitious movements. The staff of inspectors engaged on this work was quite distinct from the staff on duty in the infected places.

The Slaughter of Diseased Animals.

The slaughter and burial of diseased and in-contact animals was conducted on the lines now to be described, and entailed a large amount of labour and expense. Butchers were specially employed for slaughter purposes, and a gang of labourers for the digging of pits and burial of carcases. The method of slaughter employed in the case of cattle was shooting. Sheep and pigs were killed in the usual manner. The carcases were covered with lime, and deeply buried in large pits which were dug at suitable places. Quicklime was scattered on the surface of, and around, these pits. Portions of the carcases of quite healthy cattle and sheep were, however, sold to meat dealers. But the hides of all animals were invariably buried, in view of the possibility of their carrying infection, even though the animals might themselves show no signs of disease. No attempt was made at Swords to salvage pigs, as only a small proportion were really good fat animals, and facilities for scalding, etc., were not available. When animals were slaughtered in connection with outbreaks which occurred at other places later on, it was found possible to salvage all the carcases except those actually diseased. In all cases the owners of slaughtered cattle were awarded fair compensation for their beasts, on the valuation of a competent valuer.

Disinfection of Infected Places.

All practicable and necessary steps were taken for the disinfection of premises and lands on which disease had broken out, and no measure that experience or care could suggest for providing against a recurrence or extension of the disease in the district was left unaccomplished. Farmyards, and all such places on which diseased animals had been, were thoroughly disinfected with Jeyes' Fluid. The same disinfectant was freely used in byres, sheds, etc., and these were in addition fumigated by burning sulphur. Limewash was then applied to all parts of them, and all litter, dung, etc., remaining in such places was mixed with quicklime. The fields in which the animals had grazed were carefully strewn by machines with newly-burned lime.

Disinfection of Hay by Super-heated Steam.

Stacked hay is obviously a very probable place of lodgment for disease germs, and all stacks of hay on farms near the scenes of outbreaks at Swords were disinfected by the agency of super-heated steam. This method of disinfection which, so far as the Department are aware, had not been previously used in Ireland, proved very effective. Steam was injected from an engine into the ricks to a depth of $1\frac{1}{2}$ to 2 feet. The heat penetrated to a distance of over 3 feet. Repeated tests with a thermometer showed a temperature of 220° F. The process did not damage the hay in any way for marketing purposes.



Labourers disinfecting boots.



Labourers at Swords handing in their tools to Police.

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On examination on the day after steaming the hay was found to be quite dry, and the only evidence of the treatment was that the outside of the ricks showed a brownish appearance as if the hay had been boiled.

Disinfection of Persons.

All persons who had any dealings with diseased animals, or were required or allowed to enter infected places, were carefully disinfected before leaving. The Department's inspectors and the police and labourers never came away from these places without disinfection by sulphur or Jeyes' Fluid. Disinfecting boxes of a suitable kind, in which sulphur candles were burned, were specially provided. High rubber boots and overalls, which could easily be washed with disinfecting fluid, were worn by the inspectors, butchers and others, when on duty. In cases of vehicles leaving the infected places, the wheels of the vehicles and the horses' feet were washed with Jeyes' Fluid. Tools used in slaughter were disinfected, and tins containing a strong solution of Jeyes' Fluid were placed about in fields where any operations were being conducted, so that all persons who had authority to enter these fields could readily disinfect their hands, clothing, boots, etc. The butchers were supplied with extra suits of clothes so that they should not leave the infected places in the same clothes in which they had been working.

The clothes and boots of the "cow-doctor" were burned, and he was supplied with new ones. It was found that this man had also attended, or been in contact with, other animals than those on the Misses Cruise's farm, and the movement of these other animals was restricted.

So long as foot-and-mouth disease existed in Ireland or in Great Britain, the Department kept in operation very thorough arrangements for the disinfection of persons landing in Ireland who had been in contact with animals on board ship in transit to or from Great Britain or in any part of Great Britain. At all the Irish ports such persons were required on arrival to disinfect themselves and their clothes. Materials were provided for this purpose, and a staff detailed to look after the matter.

Poisoning of Foxes, etc., at Swords.

It appeared to the Department that foxes in the neighbourhood of Swords might be a probable means of carrying the disease, and consequently poison was laid with the object of destroying these foxes. For the same reason persons residing on or near infected places were required to confine their dogs.

Assistance from Estates Commissioners and Royal Irish Constabulary at Swords.

In the liming of the land the Department received valuable assistance from the Estates Commissioners, who kindly volunteered the services of several of their officers in working the

special apparatus obtained by the Department for this purpose. The Department are much indebted to the Commissioners for their co-operation in this matter.

In all these various operations the Department were accorded most efficient and useful aid by the Royal Irish Constabulary. A special force of 23 police was drafted to Swords by order of the Inspector General. The Department had at Swords and adjoining stations the assistance of, in all, 50 police. The police were under the command of the District Inspector at Balbriggan, who took up residence at Swords for the purpose of directing the disposition and operations of the force under his control.

All the operations carried out at Swords were under the immediate charge and supervision of the Secretary of the Department, who frequently visited the various places where work was going on, and was in constant and close consultation with the veterinary inspectors and Constabulary officers.

Efforts to Discover Origin of Disease at Swords.

The Department made all practicable efforts to discover the origin of the disease at Swords. It is true that an outbreak had occurred at Penrith, in Cumberland, on the 24th June—some days previous to the Swords outbreak—and it is possible that the infection may have been conveyed to Swords by drovers, dealers, or others, returning to the district from the North of England. But no definite evidence to establish this connection was forthcoming.

All movements of animals into or from the first infected place for two months prior to the discovery of the disease, were traced; but in no instance was anything ascertained which would lead to a suspicion that infected live stock had been moved into or near the place from elsewhere.

The possibility of hay and other feeding material and straw being a source of the infection was particularly investigated. It was stated that a diseased cow belonging to a Mrs. Weldon, who lives near Swords, had been bedded in straw which had been imported into Ireland as packing material, but on inquiry it was found that Mrs. Weldon's cow was visibly affected with the disease before being brought into contact with the foreign straw. It was further reported that manure from the Army Remount Depôt at Lusk had been conveyed to Swords, and that foreign fodder or litter had been used at that Depôt. But the officers at the Depôt assured the Department's inspectors that no foreign fodder or litter was used there, such material being obtained from the local farmers, and it was also found on inquiry that no manure from the Depôt had been brought to Swords. The matter of the movements of men as a probable means of carrying infection was also looked into, but with a negative result. The Department were further informed that foreign hares had been procured and liberated in the vicinity

of Swords, but inquiries disclosed the fact that these were not foreign hares, but had come from County Longford.

Many other and varied suggestions as to the cause or origin of the disease were proffered almost daily, in communications to the Department and to the newspapers. Mice, birds, mushrooms, bulbs from abroad, foxes and sundry other animals and things were suggested. All suggestions and suppositions which seemed to the Department to indicate probable sources of the disease were closely investigated, but no clue to its origin was discovered, and this matter remains, and apparently must always remain, a mystery.

Numerous alleged cures for the disease were also propounded, but as no cure which would remove infection or render animals immune is yet known to veterinary science, these suggestions were not very useful.

Spread of Disease at Swords.

As to the spread of the disease from one farm to another in the Swords district, foot-and-mouth disease is of such an extraordinarily infectious character, and may apparently be carried in so many diverse and elusive ways, that in this, as in other cases, it is most difficult to fix on any specific medium of diffusing the infection. The disease apparently originated on the Misses Russell Cruise's farm at Drynam, and it appears to have spread from there to Mr. Long's farm at Miltonfields, where it was found on the 1st July. This may have been due to the visit of a cow from the Misses Cruise's farm to Mr. Long's bull on the 7th June, but the evidence to establish this conclusion is incomplete. In the cases of the other infected farms, the disease was probably carried for the most part by persons, such as herds, who had been in contact with infected animals. But the connection between the various cases could not be definitely traced, except in one or two instances.

Prosecutions for Failure to Notify Disease, and for Breaches of Department's Orders.

The question of the failure of the owners of the animals found diseased at Swords, and of the persons in charge of these animals, to notify to the police the existence of disease, as required by Section 4 of the Diseases of Animals Act, 1894, came under the consideration of the Department. It was recognised that the owners, the Misses Cruise, of the first cattle affected, could not be held personally responsible in the matter. But it was considered expedient that the herd who had been in charge of the cattle should be prosecuted for failure to comply with the requirement of the Act. This prosecution was instituted chiefly with a view to the warning which its publication would convey to other persons owning or in charge of animals. The case came up at Swords Petty Sessions on the 3rd August, when the herd was convicted and a small penalty imposed.

At the Petty Sessions held at Swords on 17th August, two similar cases were heard against owners on whose premises the disease had broken out. These cases were, however, dismissed by the magistrates, who held that the defendants had no knowledge that the animals were diseased within the meaning of the Act, and, in the words of the Act, "could not with reasonable diligence have obtained that knowledge."

In connection with the enforcement of the Department's orders, and particularly the regulations applying to infected places, a number of prosecutions took place at the instance of the Department or of the police. The offences prosecuted included the movement of cows from an infected place without licence, entering an infected place without authority, movement of carcases and slaughtering of animals without licence, and failure to disinfect when leaving an infected place. Fines varying from one shilling to £2 10*s*. were inflicted. In this as well as in other parts of the country, where many prosecutions for breaches of orders were instituted by the police, the fines imposed by magistrates were generally only nominal, and did not act as an effective deterrent on offenders.

The Question of Non-Detection of the Disease at Dublin Port.

Naturally enough the question was raised as to how the apparent existence of disease in the cattle shipped to Liverpool on the 20th June escaped detection when they were inspected at Dublin port prior to shipment. An inquiry on this point was addressed to His Majesty's Government by Lord Mayo in the House of Lords on the 10th July, 1912. It should be noted in the first place that the inspection of animals by the portal veterinary inspectors before shipment from Irish ports was only an external examination. It did not include what has come to be known as "mouthing," *i.e.*, a close inspection of the lips, tongue and palate of each animal. An examination of that kind had never been customary, and would not, under the conditions of time, accommodation, and staff, then obtaining, have been practicable. It was, therefore, quite possible that animals which had developed appearances of foot-and-mouth disease on the interior of the mouth, but showed no external signs of it, might readily pass the portal inspector. In the particular case under notice it is clear that there were no exterior signs of the disease at the time of inspection. This is placed beyond doubt by the fact that the cattle found diseased at Liverpool also passed the inspection of the veterinary officers of the Liverpool markets, and that the butchers did not notice any suspicious appearances when killing them. It was only when the offal came to be dealt with at a later date that an offal dealer observed the marks of disease on the tongues.

It must be mentioned too that only three of the cattle which were shipped from Dublin on the "Slieve Bloom" came from

the infected farm at Swords. These three cattle were not those found diseased at Liverpool. The three cattle from Swords were sent to Oldham, where they were slaughtered, and no symptoms of the disease were reported either by the butchers or offal men at that town. In this connection two facts are to be noticed. The first is that veterinary opinion indicates that animals which have been exposed to the infection of foot-and-mouth disease may convey infection to other animals while themselves showing no signs of the disease. Secondly, the length of the incubative period—that is to say, the period intervening between the time of actually contracting the malady, and the time when it manifests its presence by any external signs, such as lesions on the mouth or feet—usually varies from two to ten days. These circumstances will show that animals coming from an infected place, such as the three brought from Swords, might, while themselves to all appearance unaffected, convey infection to other animals while in contact with them on board ship, and furthermore, that if disease had actually been contracted at the time of inspection, no symptoms of it might be observable then, and, in point of fact, might not appear for a period of from two to ten days later.

The Dublin Meat and Milk Supplies.

The restrictions on the movement of animals in Dublin and the surrounding counties had of course a serious effect on the supplies of meat and milk for the city of Dublin. At an early stage it became clear that the Department would have to take special steps to meet the needs of the city in these respects. Consultations took place with representatives of the Dublin victuallers and dairymen, and the Department devised a system of granting licences for movement of fat animals from a defined area to the Dublin abattoir and other approved slaughter-houses in the city and neighbourhood. The area from which these movements were allowed embraced, in the first instance, the southern half of County Dublin (the northern portion of the country necessarily being excluded, on account of the outbreaks at Swords) and parts of Counties Kildare and Wicklow bordering on County Dublin. This area was afterwards twice extended with the growing needs of the case. A number of deputations representing the victuallers and dairymen of the Dublin district waited on the Department for the purpose of making suggestions and discussing the arrangements. For the convenience of owners and buyers of stock, the Department arranged for the attendance of veterinary inspectors at fairs held within the approved area to inspect animals and issue licences for movement to Dublin.

It is customary amongst stock-owners in a considerable number of districts in the area from which these movements to Dublin were allowed, to bring their live-stock into Dublin by road. The Department considered it important, for greater

security, to require that any animals moved to Dublin under this arrangement should be conveyed by rail. They recognised a difficulty here, in that the cost of railway transit would be an additional burden on stock-owners, who had already suffered considerable loss through the operation of the Department's "stand-still" Order. The railway companies concerned, however, assisted materially in ameliorating the situation by granting temporarily reduced rates for the carriage of live stock to Dublin from certain stations within the defined area. This action on the part of the companies greatly facilitated the Department in carrying out the scheme. Arrangements were made too for licensing movements of animals to local slaughter-houses within the scheduled district.

Movements were also allowed for feeding purposes in necessary cases where pastures had been eaten down by the animals detained on them, and dairy herds were replenished by the movement of milch cows where that was required. The result of these arrangements was that the supplies of milk and meat required for consumption in the city were well maintained during the period of restriction.

These movements were only licensed in exceptional cases of proved necessity, and did not, of course, interfere with the operation of the restrictive measures ordained by the Department's Order. Moreover the strictest precautions were taken to ensure that only perfectly healthy animals were moved, and that these animals were not exposed to any risk of infection on the journey. No movement was sanctioned until all the animals to be moved, and all animals in contact with them on the same farm or premises, had been examined by a veterinary inspector and found quite free from disease. On arrival at the slaughter-houses the animals were again inspected. It was required that animals in course of movement on licence should not be allowed to come in contact with any animals not being moved on licence. The movements were all conducted under police supervision. They were, as already stated, made by rail, and no portion of them was allowed by road, except to a railway station for the purpose of entrainment. The Department utilised for the inspection of animals under this arrangement the services of the veterinary inspectors of the Local Authorities stationed within the area from which the movements were authorised.

Inquiries Throughout Ireland.

Some of the earliest steps taken by the Department were directed to ascertain whether the disease existed in any parts of Ireland other than the Swords district. With the consent of the Inspector General, the Royal Irish Constabulary force at all stations throughout the country were instructed to use all practicable vigilance and inquiry to this end. Inquiries were also made through the Department's own veterinary inspectors and the veterinary inspectors of the Local Authorities, as well



Paying the labourers at Swords.



Inspectors at Swords examining carcases of slaughtered animals.

as through the veterinary surgeons employed on the Department's Veterinary Dispensary Sehemes. Further, the Agrieultural Instruetors in all the eounties of Ireland and the Agricultural Overseers and Assistant Overseers in the "congested" counties were required to report as to the existence of disease or suspeeted disease in their respeetive distriets. Reports reeeived from these various offieers during the month of July and early August showed that there was no evidenee of foot-and-mouth disease in any part of Ireland other than the infeeted distriet at Swords. Numerous reports of suspected cases of the disease were received daily from the Constabulary and from local veterinary inspeetors and were promptly dealt with by the Department's inspeetors.

Packing Material as a Possible Means of Spreading Disease: Department's Warning.

The risk of foot-and-mouth disease being spread by hay and straw used for the packing of imported goods, coming from foreign eountries where the disease is prevalent, was one to whieh the Department eonsidered it important speeially to direet the attention of the publie. This question had been under the consideration of the Departmental Committee appointed by the President of the Board of Agrieulture and Fisheries to inquire into foot-and-mouth disease in Great Britain. In their report, issued last year, the Committee pointed out that numerous imported articles are paeked in hay or straw, and that a large proportion of this packing ultimately reaches farms as manure. The Committee eonsidered that this packing eonstitutes a souree of danger, but in view of the serious dislocation of general trade which the prohibition of its use would entail, they were not prepared, without further evidence, to advise that eourse. They recommended, however, that persons using sueh hay and straw should be warned of the element of danger whieh it eontains, and of the risk of allowing it to eome in eontaet with any animals. They also advised that, where possible, it should be burned.

The Department issued a notice, whieh was widely eireulated, ealling attention to these faets, and urging upon manufaeturers and traders, and all who reeeive hay and straw used for the paeking of foreign imported goods, that they should take steps to prevent this packing material being sent to farms or other plaees where it could come into eontaet with live-stock, and should make arrangements for burning it.

Cases of Foot-and-Mouth Disease in England Attributed to Irish Origin.

During the course of the Irish outbreaks in July and August the Department reeeived from the Board of Agrieulture and Fisheries several reports of eases of foot-and-mouth disease at plaees in England, whieh were said to have oecurred amongst eattle shipped from Ireland. These cases were exhaustively

investigated by the Department, but no evidence was forthcoming in connection with any of them to indicate that the animals were suffering from foot-and-mouth disease at the time of export from Ireland, nor was any trace of the disease found at any of the farms from which they came, or amongst animals which had been in contact with them. It will be of interest to record brief particulars of these cases.

The Wakefield Case.

The first case, reported on 4th July, was that of a cow which was found to have symptoms of foot-and-mouth disease by one of the inspectors of the Board of Agriculture and Fisheries at Wakefield on 1st July. This animal had gone there from Limerick *via* Waterford and Liverpool. It was forwarded with 16 others to Wakefield, and on arrival was placed in a field adjoining one occupied by some of the cattle shipped from Dublin by the dealer who exported the cattle found diseased at Liverpool. The inspector of the Board of Agriculture considered that the lesions of the disease appearing on this cow were too old to be accounted for by infection from this proximity, and that the animal was probably infected before landing at Liverpool.

Immediate inquiries were instituted by the Department with the object of tracing the places of origin and course of transit of all the animals shipped by the Limerick dealer who exported the diseased animal. These particulars were speedily ascertained. Veterinary inspectors forthwith visited the farms from which the cattle in question came, and carefully examined all the animals at these places, as well as all animals which could in any way have come in contact with the Limerick consignment. No trace of foot-and-mouth disease was found amongst any of these animals. The total numbers of animals examined were 749 cattle, 89 sheep, 35 swine and 4 goats. As a further precaution, a second veterinary inspection of all these animals was made about three weeks later, with the same result. It was found that the consignment from Limerick had been in close contiguity at Stanley Market, Liverpool, to cattle belonging to the Dublin dealer referred to, and had been sent from Liverpool to Wakefield on the same train with some of that dealer's cattle, as well as being placed in adjacent fields at Wakefield.

On a survey of all the circumstances the Department felt unable to accept the view that the cow in question was affected with foot-and-mouth disease before leaving Ireland, and they informed the Board of Agriculture and Fisheries accordingly. They pointed out that the very complete inquiries made in Ireland indicated the great improbability of this cow having contracted the disease before leaving this country, while it was known that the animal was in contact with affected cattle after its arrival in England. Further, it was noted that the animal in question had undergone a long and fatiguing journey, and

that under conditions of fatigue or exhaustion lesions of foot-and-mouth disease would probably develop much more rapidly than would otherwise be the case. Moreover, if the animal had been diseased before leaving Ireland, it was practically certain that the infection would have spread to some of the other animals with which it had been in contact.

The Alleged "Waterford Head."

The next case reported was one which attracted considerable notice—that of the alleged "Waterford head." On the 6th July the Veterinary Inspector of the Board of Agriculture and Fisheries at Liverpool informed the Board that he had examined a carcase head of cattle in the meat office at St. John's Market, that this head showed lesions of foot-and-mouth disease in the hard palate, and that further evidence had been destroyed by the removal of the tongue, right cheek, lower lip, and part of the upper lip before leaving Ireland. It was further stated that the head arrived in Liverpool from Waterford with nine others on the 4th July, and the names of the consignors and consignees were given.

Inquiries were set on foot at Waterford, and an inspector of the Department was sent to Liverpool to pursue investigation there. It was found that the ten cattle from which the heads in question came were purchased at Carrick-on-Suir fair on the 27th June by a dealer named Richard Maher. They were brought to Waterford on the 28th June, inspected by the Department's Portal Veterinary Inspector, and passed for shipment. In consequence of the British Board's Order prohibiting landing in Great Britain, which had just then been promulgated, they were not shipped, but were taken to a field at Abbeylands, near Waterford, where they remained until 2nd July, when they were brought to the public abattoir at Waterford and slaughtered, the carcases and offal being conveyed to Liverpool. The cattle were examined on that date by the veterinary inspector to the Local Authority, two being alive and eight slaughtered at the time of inspection. This inspector specially examined the tongues, mouth and feet, but found no symptoms of foot-and-mouth disease. The tongues were removed before shipment and packed separately from the heads. This is the regular custom of the trade in most places in Ireland. All persons who were concerned with these animals at the abattoir or elsewhere in Waterford, were closely examined. The butcher who killed the animals made a sworn statement that no mutilation, such as was suggested in the report received from the Board's Inspector at Liverpool, had taken place, and that no parts of any head except the tongue were cut away before shipment. This statement was corroborated by the skinners and others who had handled the carcases, and none of these persons noticed any signs of disease on any of the animals. The entire evidence adduced refuted strongly the supposition

that any head from this lot of ten had been mutilated before being shipped from Waterford. In point of fact the results of these investigations demonstrated clearly the extreme improbability of the head in question having been shipped from Waterford at all.

A very thorough investigation was made in regard to the ten cattle bought by Richard Maher. The locations of the premises of the original owners of these cattle and of any which were known to have been in contact with them were ascertained, and all animals at these places were submitted to a minute veterinary examination and re-examination. No signs of foot-and-mouth disease appeared amongst them. The animals (consisting of 19 cattle and 347 sheep) on the fields at Abbeylands, on which Maher's ten cattle had grazed for six days, were detained and kept under veterinary observation for a considerable time. No appearances of the disease were found in any of these animals either. A large number of other animals which had been in lairage at Abbeylands at this time, and had subsequently been removed, were traced to various homesteads, and were examined and found healthy.

These facts provided strong presumptive evidence to show that none of the ten animals could have suffered from foot-and-mouth disease. It would be practically impossible to suppose that an animal suffering from such a highly infectious malady could have been for any appreciable time in contact with these other animals without conveying infection to them.

It was clear therefore that the inquiries at Waterford must lead to one of two conclusions. Either the mutilated head was not sent from Waterford, or, if it were, the animal from which it had come had not been affected with foot-and-mouth disease. The preponderating weight of evidence seemed to be in favour of the former conclusion.

Meanwhile the Department's inspector had been prosecuting his inquiries in Liverpool. The course of transit and destinations of the ten heads and of the tongues were ascertained. Consignments of ox and sheep feet which had been sent at the same time to Liverpool by the same firm in Waterford, were examined by the Board's and the Department's inspectors and showed no lesions of disease.

This matter being one of grave importance to the Irish cattle trade, and of more than ordinary public interest—the Liverpool inspector's report was read in the House of Commons by the President of the Board of Agriculture and Fisheries—the Board and the Department agreed that an independent inquiry into the full facts and history of the case should be instituted. It was accordingly arranged that this inquiry should be conducted by two solicitors, Mr. R. W. Grecnwood, of the Treasury Solicitor's Department, London, and Mr. James Wood, of Belfast. These gentlemen carried out a very full investigation at Liverpool, Dublin, and Waterford, and as a result came to the conclusion

that the diseased head was not one of the ten shipped from Waterford, and that there was no ground for any eharge of purposeful mutilation by the Waterford trade.

The Blackpool Case.

On the 8th July two further eases of a somewhat similar nature to the first were reported to the Department.

One of these eases oeeured at Blaekpool, where the disease was confirmed in two heifers, whieh were said to have formed part of a eonsignment of nine heifers sent from Drogheda to Salford Market, where they arrived on the 25th June. The Board of Agrieulture and Fisheries were of opinion that the disease might have been eontraeted in Salford Market, but it was thought desirable that the plaees of origin of these nine heifers, and of twenty-two other eattle whieh had been shipped from Drogheda by another dealer two days previously, should be aseertained, and a veterinary examination of all animals at these plaees undertaken. This was promptly done, and in every ease the animals were found to be quite healthy. One hundred and nine animals were examined on the farm from whieh the nine heifers eame, and at the plaees of origin of the other eonsignment, 449 eattle and 488 sheep were inspeeted. In this instanee also it was evident that the diseased animals had not been affeeted before leaving Ireland.

The Gateshead Case.

The other ease was one of disease eonfirmed at Gateshead on the 4th July, in animals said to have been purehased at Antrim fair on the 26th June, shipped from Belfast to Fleetwood on the 28th June, and sent to Gateshead *via* Carlisle. The veterinary inspeetor of the Board of Agrieulture and Fisheries who dealt with the ease eonsidered that the lesions of the disease were of old standing and would have developed before the animals left Ireland. Full inquiries were immediately taken in hand, and the following faets were elieited :—

The diseased animals belonged to a lot of 26 store eattle whieh were purehased on the 27th June at Antrim fair by a dealer from Magherafelt. These eattle were sent to Belfast on the same date, and after inspeetion by the Department's Portal Veterinary Inspeetor, were shipped to Fleetwood. On arrival at Fleetwood they were detained for some time and were inspeeted by a veterinary surgeon from Blaekpool who, having made a close examination of the tongue, lips and feet of eaeh animal, deelared the eattle free from disease. At Gateshead they were put into a field adjoining lands on whieh were 270 head of eattle that were subsequently slaughtered owing to the existenee of foot-and-mouth disease amongst them. The 26 cattle were again inspeeted on the 30th June by a veterinary surgeon at Gateshead, who also deelared them free from disease.

A eareful veterinary examination was made of all the cattle

on the lands of the farmer from whom these 26 beasts were bought at Antrim fair. The places of origin of other cattle which had been bought by the dealer referred to about the same time from other persons at the fairs at Antrim, Maghera and Saintfield, and in Belfast, were likewise ascertained, and all the animals on these places were also subjected to close veterinary inspection. No symptoms of foot-and-mouth disease appeared amongst any of the cattle inspected.

It was further ascertained that a milch cow which had been grazing with the 26 store cattle in question for three months previously showed no symptoms of the disease; and also that 22 head of cattle and 3 sheep which were put on the same lands immediately the 26 store cattle were taken off, remained healthy.

Having regard to the fact that these animals were subjected to three veterinary examinations—at Belfast, at Fleetwood, and at Gateshead—and to the immunity from disease of the other animals referred to in the preceding paragraph, the Department were quite unable in this case also to accept the view that these cattle were affected with foot-and-mouth disease before leaving Ireland. They informed the Board of Agriculture and Fisheries accordingly.

The Actinomycosis Case at Liverpool.

It is convenient to mention here one further case of this character, although it did not arise until 4th September. On that date the Department were informed by the Board of Agriculture and Fisheries that a suspected case of foot-and-mouth disease had been found, at Liverpool in a head exported by a Dublin firm. A veterinary inspector of the Department was sent forthwith to Liverpool, and on examination of the head reported that the animal had been affected with actinomycosis, and that there was nothing to indicate that it had suffered from foot-and-mouth disease. The Chief Veterinary Inspector of the English Board subsequently examined the head and his opinion agreed with that of the Department's Inspector.

Further Irish Outbreaks.

The Outbreak at Stamullen, Co. Meath.

The Department and the public had strong reason for hoping that the thorough and drastic action which had been taken in checking the progress of the disease at Swords would have been successful in confining it to that immediate neighbourhood. But these hopes were disappointed by an outbreak of the disease which occurred at Clinstown, Stamullen, County Meath, on the 13th August. In this case the outbreak was happily not of a serious character. Only three cattle were found to have contracted the disease. Restrictions were at once placed on the infected farm, and a corps of veterinary inspectors despatched



Examining carcases at Swords.



Digging pit for burial of slaughtered animals.

to conduct the necessary operations there. The diseased animals were promptly slaughtered, as well as 178 cattle, 66 sheep, and one goat which had been in contact with them. A cordon of police was established round the infected place, and, as in the case of Swords, kept rigid and effective guard to prevent any movements that might spread the disease. A special Constabulary station was opened close to the infected place for the accommodation of the police force engaged in dealing with the outbreak.

An extensive and very critical inspection of all animals on neighbouring farms, and throughout a district having a considerable radius from the farm at Clinstown, was systematically carried out by the veterinary inspectors, but no further case of disease was found in this district.

The Department in this instance also made all practicable endeavours to ascertain the origin of the disease, but without success. It was found that no animals had been moved into or out of the infected farm since the previous March, with the exception of some store cattle which were moved to the premises in May. No fodder, litter or feeding stuffs had been received at the farm from outside sources. Nothing came to light which would indicate any direct connection between this outbreak at Stamullen and those at Swords. Inquiries were made as to possible movements of men from the Swords district to Stamullen, but no such movements were traced.

Movement Restrictions consequent on Stamullen Outbreak.

In consequence of this outbreak further restrictions on the movement of animals had necessarily to be imposed. The Department accordingly issued an Order placing an embargo on movements into, out of, or within the Counties of Dublin, Meath and Louth. The slaughter of animals and the movement of carcases were also prohibited, except on licence of an inspector of the Department or other authorised officer.

THE OUTBREAK AT ARDMULCHAN, NAVAN.

On the following day—14th August—another outbreak was confirmed—at Ardmulchan, Navan, Co. Meath. In this instance only one animal—a heifer—was affected. In view of the strong probability of the disease spreading to the other animals on the same farm, the Department decided to slaughter all the animals, amounting to 66 cattle and 134 sheep. All the protective and disinfecting arrangements and measures of farm-to-farm inspection used in the previous cases were promptly adopted.

Ardmulchan, which is in the centre of Co. Meath, being within the existing scheduled district, this outbreak did not necessitate an extension of the district under movement restrictions.

No live-stock had been moved on to this farm for at least three months before the date of the outbreak, and, with the exception of some sheep which had been sent to Birkenhead and slaughtered

there, no animals had left the place for a considerable time. No hay or straw or other forms of fodder or litter had been brought into the premises. No appearances of disease were found on any of the animals slaughtered, with the exception of the one original case, nor in any animals inspected in the vicinity. The origin of the disease in this instance therefore also remains obscure.

The Ardee and Enfield Outbreaks.

These cases were followed on the 15th August by an outbreak at Tullykeel, near Ardee, County Louth, and on the 16th by one on the rectory lands at Rathcore, near Enfield, County Meath. In both these cases the disease was of a mild nature. At Tullykeel only one beast was affected, and at Rathcore, two. These diseased animals, and also one in-contact animal at Tullykeel, were slaughtered, but no further slaughter was considered necessary. All other animals on the infected and adjoining lands were of course rigorously restricted as to movement, and kept under veterinary observation. But no symptoms of the disease appeared amongst any of them.

A strong guard of police was maintained at both places, and at Enfield a special station was temporarily established.

A close farm-to-farm inspection of animals in the vicinity of both these infected places did not reveal any additional disease, nor were any movements of persons, or of animals, fodder, litter or other things discovered which would suggest any means of carrying the disease from places already infected.

"*Stand-Still*" *Restrictions Extended.*

In consequence of the outbreak at Enfield, which is close to the border of County Kildare, the district under "stand-still" restrictions (*i.e.*, the Counties of Dublin, Meath and Louth) was, by an Order of the Department, extended so as to include a portion of the northern part of County Kildare reaching to about seven miles from the boundary between County Kildare and County Meath.

Hay and Straw Restrictions.

The same restrictions on the movement of hay and straw which had been imposed at Swords were also applied to the districts within a radius of, roughly speaking, three miles from each of the infected places at Stamullen, Ardmulchan, Tullykeel, and Enfield.

The Co. Kildare Outbreaks.

After a short interval the disease appeared in County Kildare. An outbreak was confirmed on the 27th August at Ballysax, close to the southern boundary of the Curragh Camp. The usual steps as to restriction and slaughter were at once taken.

Eight cattle and 14 pigs were affected. There were 147 other animals—17 cattle, 122 sheep and 8 pigs—on the lands. These animals were all exposed to danger of infection, and were therefore slaughtered, as well as the affected cattle and pigs.

This outbreak necessitated a further extension of the scheduled district, into, out of, and within which, the movement of animals was prohibited. An Order was accordingly made scheduling the whole of County Kildare, and eight electoral divisions in the western part of County Wicklow adjoining County Kildare.

On the 2nd September, another case, involving 15 cattle, appeared at Kinneagh, County Kildare, about three miles from the scene of the outbreak at Ballysax. Eighty-three in-contact cattle were slaughtered in addition to the 15 diseased animals.

Another and final case in County Kildare—at Sunnyhill, close to Ballysax—was reported on the 16th September. Here only one bullock showed symptoms of the disease, but 35 other cattle and 11 sheep, to which it seemed practically certain that the infection would extend, were also slaughtered. This farm at Sunnyhill adjoins the infected place at Kinneagh, and the respective herds had for some time before the outbreaks been in close proximity. This case was, therefore, virtually an extension of the Kinneagh outbreak.

In both these instances movement restrictions were maintained in a scheduled district with a radius of, roughly speaking, fifteen miles from the scene of the outbreak.

An inner area of about three miles radius from the infected place was also scheduled, within and from which the movement of hay and straw was prohibited.

In their efforts to exterminate the disease in County Kildare, the Department received valuable assistance from the military authorities, who suspended certain movements of troops stationed at the Curragh Camp, lest these movements might be a means of carrying infection.

Statements were for some time in circulation attributing the outbreak at Ballysax to straw or other material imported into Ireland as packing on foreign fruit or wines. It was rumoured that this material had come from the Curragh Camp, and had been used as litter for the pigs that were subsequently found to have foot-and-mouth disease. The information possessed by the Department indicated at first that there were strong *prima facie* grounds for suspecting that the disease might have been conveyed to the infected animals in this manner. But inquiries made by the Department's inspectors did not bring forth any evidence which would definitely establish this view.

It was also said that swine in the district had been fed on refuse from the officers' mess. This was found to be the case, and fifteen places where refuse of this sort was used for pig feeding were visited by inspectors. All the animals on these places, comprising 194 swine and 11 cattle, were examined and found quite healthy. In consideration of these facts the Department could not attribute the outbreak to this source.

The Outbreaks in Co. Wicklow.

On the 5th September the disease broke out in County Wicklow, when a bullock was found affected on a farm at Lugatryna, close to Dunlavin. The diseased animal was slaughtered, but no slaughtering further than this was undertaken.

An Order was immediately issued imposing the usual movement restrictions on an area covering fifteen miles from the infected place. This area included the Naas No. 2 and Baltinglass No. 1 Rural Districts in County Wicklow, and three electoral divisions on the northern border of County Carlow. The whole of County Kildare had already been scheduled. An area of the customary extent was also scheduled as regards the movement of hay and straw, and full arrangements were made for the enforcement of the Orders by the police.

On the 1st October, one of the Department's veterinary inspectors in the course of the inspection of farms in the neighbourhood of Dunlavin, which had been going on since the outbreak just mentioned, discovered a bullock on a farm about a mile distant from Lugatryna showing symptoms of foot-and-mouth disease. This was confirmed as a case of the disease. The affected animal was slaughtered, as were also 11 cattle, 4 sheep and 2 pigs which were in contact with it on the same lands. The infected locality had been stocked with hares, and it is possible that the disease may have been carried by this means.

In combating the disease at the centres mentioned above, the Department had the co-operation of the Local Hunts, who, realising the risk of spreading contagion that would be incurred if horses and hounds should pass through districts in which there were infected farms and premises, abstained from hunting in the scheduled districts.

The Outbreaks in Co. Fermanagh.

On the 27th August a case which had been reported as suspicious on a farm at Corravehy, Thompson's Bridge, County Fermanagh, was confirmed by one of the Department's veterinary inspectors as foot-and-mouth disease. A staff of inspectors was immediately despatched to the place. Only one cow was affected with the disease, and this was immediately slaughtered. Seven other cattle and 3 pigs which had been in contact with the diseased animals were also slaughtered. The same measures of disinfection as before were strictly enforced, and through the agency of the Royal Irish Constabulary a close cordon was maintained around the disease area. A veterinary inspection of all animals on surrounding farms was undertaken. An area of not less than fifteen miles radius (comprising, roughly speaking, the part of County Fermanagh south of the roads from Kiltyclogher *via* Derrygonnelly to Ballinamallard, and the portion of County Cavan north-west of the rail-

way line from Killeshandra *via* Crossdoney and Cavan to Redhills) was placed under movement restrictions, and a smaller area under hay and straw restrictions. The police were, as usual, at once informed by telegram of these arrangements, as were also the portal veterinary inspectors at Sligo, Derry, Belfast and Newry, who were instructed to exercise special vigilance in inspection, in view of possible movements of animals for shipment from these ports having taken place from the scheduled district previous to the publication of the Department's Order.

The scene of the outbreak in County Fermanagh was about 60 miles away from the nearest disease centre, and no connection between that outbreak and the others could be established, nor could anything be ascertained to account for the existence of the disease in County Fermanagh.

This outbreak was followed on the 31st August by another in the same locality, the infected farm being situated at Clonfane near Thompson's Bridge. Three diseased cattle were slaughtered, as well as 5 cattle and 2 pigs which were in contact with them. It was found that the farmer whose cattle took the disease at Clonfane, had, previous to the discovery of the outbreak at Corravehy, been several times on the premises at Corravehy where the disease occurred, and this appears to have been a very probable source of conveying the infection. The names and addresses of all other cattle owners who had visited the farm at Corravehy were ascertained, and a careful examination made of all the animals on their farms.

On the 10th September a case of an ailing milch cow was reported by a farmer at Drumhervin, Thompson's Bridge, to an inspector of the Department stationed in the district, who, on inspection, pronounced the case to be foot-and-mouth disease. While examining the cattle on the farm the inspector found another cow affected. These 2 cows were slaughtered, and also 11 cattle, 4 pigs and 2 goats which had been in proximity to them. The usual measures of cleansing and disinfection were carried out.

Two more outbreaks occurred before foot-and-mouth disease was exterminated in County Fermanagh, one at Stumpy Hill (about a mile north of Swanlinbar) which was discovered during a house-to-house inspection by one of the inspectors on the 23rd September, and another at Laragh, near Swanlinbar, on 5th October. The former case necessitated the slaughter of 2 diseased cattle as well as 8 other cattle, 3 pigs and 2 goats. In the Laragh case, 27 cattle, 19 pigs and 2 goats were slaughtered. Neither of these cases presented any features of special interest.

The Co. Fermanagh Scheduled Districts.

The scheduled district in County Fermanagh had on the 23rd September been contracted so as to omit the parts east of Lough Erne, and east of the railway line running from Enniskillen to Clones. The great natural barrier formed by the

Upper and Lower Loughs and River Erne constituted so effective a boundary that it was not thought necessary to maintain under restrictions the portions of the county thus cut off from the seats of infection. A small portion of County Cavan lying beyond the fifteen miles limit from the infected places was at the same time omitted from the scheduled district.

The farms on which the two last-mentioned outbreaks took place were situated about three miles to the south-west of the previously infected places, and it was therefore necessary on the occurrence of these outbreaks to extend both the scheduled district and the smaller hay and straw prohibited area in that direction. Orders were made by the Department accordingly. The scheduled district thus enlarged comprised the portion of County Cavan mentioned last, a small portion of County Leitrim bordering on County Cavan, and the original area in County Fermanagh. The scheduled part of Fermanagh had to be restored to its original dimensions (the parts east of Lough Erne, etc., being brought in again) in order to meet requirements which had arisen in connection with the Department's negotiations (referred to later) with the British Board of Agriculture respecting the conditions of exportation of Irish live-stock to Great Britain.

The Mullingar Outbreaks.

There now only remain to be described the outbreaks of foot-and-mouth disease in County Westmeath. After the 5th October no further case of the disease occurred in any part of Ireland outside that county. But on the 18th October the disease was found at Mullingar under conditions which led to a more serious and extensive succession of outbreaks than any previously experienced during the year. Between the 18th October and the 7th November 37 outbreaks occurred in and around the town of Mullingar. None of the centres of disease was more than three miles distant from the town.

The first information of suspected foot-and-mouth disease at Mullingar was received on the 18th October in a telegram from the veterinary inspector of the Local Authority. One of the Department's veterinary inspectors, who was at the time at Enfield, was instructed to proceed to Mullingar immediately to examine the suspected animals. The same afternoon he reported that the cases were foot-and-mouth disease. The disease was found at five different places on that evening. On the following day—19th October—suspected disease was reported at six places in or adjoining Mullingar, and on veterinary examination foot-and-mouth disease was found at all these places. Three further cases were confirmed on the 20th October.

A staff of veterinary inspectors was sent to Mullingar to deal with the heavy and arduous work arising from the outbreaks. An exhaustive farm-to-farm inspection of all animals in the vicinity was carried out, and a police guard was maintained round the infected locality by day and night to enforce the



Group of the Royal Irish Constabulary at Swords.



Liming the land.

Department's preventive and restrictive regulations. A large force of police was drafted to Mullingar by the Inspector General, and was placed under the command of a District Inspector specially detailed for the purpose.

The railway station at Mullingar is a large centre for the cleansing of cattle trucks. The Midland Great Western Railway Company assisted the Department's efforts to prevent the spread of infection by discontinuing the use of the Mullingar station as a place for the concentration and cleansing of their trucks.

The Rapid Spread of Disease at Mullingar.

The rapidity with which the disease spread in the Mullingar district was due to the fact that animals which were affected belonging to different owners had been grazing together in the town parks of Mullingar, and had been moved daily along the same roads to the owners' premises for milking.

The Co. Westmeath Scheduled District.

Immediately on the confirmation of the disease in Mullingar on the 18th October, the Department made an Order prohibiting the movement of cattle, sheep, goats or swine into, out of, or within a district extending to fifteen miles and upwards from that town. In addition to a large part of County Westmeath this scheduled district embraced portions of County Longford, County Meath and King's County. A smaller area, within about three miles of the town, was placed under restrictions as regards movement of hay and straw.

On the 22nd October disease was found at thirteen different places. On the 23rd an additional outbreak occurred, followed by three outbreaks on the 25th, three on the 26th, and one on the 28th. A further case occurred on the 5th November at Catherinestown, about three miles south of Mullingar, and the final outbreak in this district, which was also the last in Ireland, took place on the 7th November.

The Westmeath Hunt co-operated with the Department in the matter of preventing the spread of the disease, by refraining from hunting in the large scheduled district during the continuance of the restrictions.

Rumours were for some time in circulation, and were indeed referred to in questions in Parliament, to the effect that the disease had been deliberately introduced into Mullingar by interested persons, for the purpose of continuing the embargo on the exportation of Irish cattle to Great Britain, and thus helping foreign meat dealers to operate more freely in the English markets. The Department had no evidence whatsoever which would tend to support these allegations, which were therefore regarded as quite unfounded.

The number of animals found diseased, and the numbers of diseased and in-contact animals slaughtered in connection with the Mullingar outbreaks, are, for convenience, given in the appended table :—

TABLE SHOWING NUMBERS OF ANIMALS FOUND DISEASED AND NUMBERS OF ANIMALS SLAUGHTERED IN CONNECTION WITH THE OUTBREAKS IN COUNTY WESTMEATH.

Date of Outbreak	Place of Outbreak	No. found Diseased	Total No. slaughtered including diseased animals and animals exposed to infection			
		Cattle	Cattle	Sheep	Swine	Goats
Oct. 18	Annebrook, Mullingar	3	5	—	2	—
,, ,,	Mount St., ,,	1	2	—	—	—
,, ,,	Austin Friar St. ,,	1	3	—	—	—
,, ,,	Fortfield, Ardmore	4	4	—	—	—
,, ,,	13 Greville St., Mullingar	1	1	—	—	1
,, 19	,, ,,	4	20	23	—	—
,, ,,	Ballinderry, ,,	11	43	81	—	—
,, ,,	2 Greville St., ,,	1	1	—	1	—
,, ,,	Millmount Field, Ballinderry	3	3	—	—	—
,, ,,	Bleachyard, Mullingar	2	2	—	—	—
,, ,,	Ballinderry, ,,	2	3	—	—	—
,, 20	Belvedere Ter., ,,	4	4	—	—	—
,, ,,	Harbour Field, Robinstown	3	3	—	—	—
,, ,,	Dibb's Lane, Mullingar	2	7	—	—	—
,, 22	Boardstown, ,,	6	99	98	—	—
,, ,,	Saunderson's Bridge	2	5	—	—	—
,, ,,	Ballinderry, Mullingar	2	2	—	—	—
,, ,,	Ballinderry, ,,	7	9	—	—	—
,, ,,	Commons, Military Rd. ,,	6	10	3	—	2
,, ,,	Dominick Street, ,,	8†	9	—	9	1
,, ,,	Royal Canal Bank, Baltrasna	1	1	—	—	—
,, ,,	Ballinderry ,,	1	2	—	—	2
,, ,,	Barrack Street, ,,	1	1	—	—	—
,, ,,	Newtown	2	2	—	—	—
,, ,,	Belvedere, Pettitswood	4	26	20	—	—
,, ,,	Lands near Railway Station, Mullingar	4	22	47	—	1
,, ,,	Ballinderry ,,	3	4	—	—	2
,, 23	Mullingar,	2	3	—	—	—
,, 25	Lynn Lodge	2	2	—	—	—
,, ,,	Presentation Convent, Mullingar	1	3	—	1	—
,, ,,	Golf Links, Lynn	1	66*	—	—	—
,, 26	Austin Friar Street, Mullingar	1	1	—	4	—
,, ,,	Old Chapol House	2	3	—	2	—
,, ,,	The Lynn	3	4	—	—	—
,, 28	Hopestown, Ballinea	3	22	28	—	—
Nov. 5	Inniscoffoy, Catherinestown	5	7	15	—	—
,, 7	Lynn Lodge	3	22	—	—	—
	TOTAL	112	426	315	19	9

*Including 47 cattle slaughtered in King's Co., as "in-contact" with the Westmeath outbreak.

† In addition to 1 swine found diseased.

Special Movements on Licence for Breeding Purposes, &c.

During the months of September and October the Department arranged extensively for permitting movements of animals on licence to Counties Dublin, Kildare, Meath and Louth for breeding purposes, and for the movement of animals to bacon factories, and of milch cows to pastures or dairy yards within certain parts of the scheduled areas. Steps in this direction had become requisite for the relief of stock-owners, breeders, and dairymen living within those areas who were suffering heavy losses through the foot-and-mouth disease restrictions. The Department, therefore, arranged for the attendance of veterinary inspectors at sundry fairs in central, southern and western Ireland, with the object of their issuing licences for these movements. Large numbers of animals were moved from the fairs (which included the great October fair at Ballinasloe) after veterinary inspection. Animals were not, of course, allowed to be brought to localities near infected places.

The Suspicious Cases at Dublin Port.

Late in November there occurred two instances of detection of suspicious appearances in cattle during veterinary inspection at Dublin port.

On Thursday evening, 28th November, when a cargo of 486 store cattle was being shipped from the North Wall, Dublin, on the s.s. "Tiger," for Dundee, one bullock was separated from the rest, and not shipped, because of an old abrasion which was found on the tongue by one of the Department's veterinary officers during the veterinary examination. The abrasion was of so old a date—being practically healed—that its cause could not be definitely stated, and it had long passed the infective stage, that is, the stage at which the disease could be communicated, if it was due to an infectious disease. The fact that the bullock had been in contact for several months with a number of others of the lot shipped, and that none of these presented any symptoms of foot-and-mouth disease, was regarded as confirmatory evidence that the case was not foot-and-mouth disease.

The Department apprised the Board of Agriculture and Fisheries of the circumstances at the time of shipment. The tongue of the animal, which had been slaughtered, was subsequently sent, at the request of the Board, to their laboratory for inspection, and the Board informed the Department that their Chief Veterinary Officer considered it a case of foot-and-mouth disease, though in his opinion the lesion was a month or two months old. In the meanwhile the Board had ordered the detention at Dundee of the cattle shipped, for a period of observation.

On Saturday, 30th November, a heifer, which formed part of a consignment of 148 store cattle intended for shipment from Dublin port to Manchester, was found during the veterinary examination by the Department's officers to present an old

lesion on the tongue somewhat similar to that of the bullock above referred to. In this instance the Department decided to order the detention of the stock for further observation, as well as some sheep and cattle which were for a short time in contact with them in the same yard. All these animals were isolated and placed under observation for the time being in a yard at the extreme end of the South Wall. The lesion in this case was an old one and past the infective stage, and in the opinion of the Department's veterinary officers was probably not one of foot-and-mouth disease. Their opinion had regard to the history and circumstances of the case and to their experience during the recent outbreaks, and the fact that the cattle which had been in contact with the animal in question for several months had shown no symptoms of the disease, corroborated this view.

The facts of this case were also immediately communicated to the Board of Agriculture and Fisheries, one of whose veterinary inspectors visited Dublin on Tuesday, 3rd December, and on seeing the tongue of the suspected animal expressed the opinion that it was a case of foot-and-mouth disease, though the lesion was an old one. This tongue was also forwarded to the laboratory of the Board of Agriculture and Fisheries for examination by the Board's Chief Veterinary Officer, who likewise concluded that the case was foot-and-mouth disease. The Department had the tongue examined by Professor Mettam, Principal of the Royal Veterinary College, Dublin, as well as by their own veterinary officers, and Professor Mettam expressed the opinion that it was possible the case might not be one of true foot-and-mouth disease, though very like it, and that the lesion was an old one and had passed the infective stage.

The Department took steps at once to ascertain the places from which the two suspected animals, and those which had been in contact with them, came. These places were visited by veterinary inspectors of the Department, and all the animals thereon and on adjoining farms, were examined and found quite free from disease.

The cargo of store cattle detained at Dundee was kept under close veterinary observation for fourteen days. During that time the animals showed no suspicious symptoms, and on termination of the period they were released by the Board, and distributed to the farms of their purchasers in Scotland, on the same conditions as applied to other shipments of stores from Ireland. The animals detained at the South Wall were also found to be quite healthy, and were shipped in two lots to Birkenhead and Manchester, on the 21st and 23rd December, the lot sent to Manchester being for slaughter, and those sent to Birkenhead for feeding as stores.

The fact that these two lots of cattle, which had been in close contact with the suspected animals, did not develop any symptoms of disease, tended most strongly to establish the accuracy of the opinion expressed in the first instance by the Department's veterinary advisers.

The Newry-Birkenhead Cases.

On the 4th December news was received from the British Board that their veterinary inspector in charge at Birkenhead had that day discovered a case of foot-and-mouth disease amongst a consignment of Irish cattle landed at that port from Newry, and that the Board had in consequence entirely prohibited the landing of animals in Great Britain from any port in Ireland pending investigations.

On the following day the Board reported that on completion of the inspection of the cargo at Birkenhead four additional cattle had been found affected with the disease. Immediate inquiries as to the places of origin of the animals concerned were undertaken by the Department. The cargo had been shipped from Newry on the s.s. "Iveagh" and had consisted of 73 cattle, 143 sheep and 525 swine. No disease was discovered in the sheep or swine. The places that the 73 cattle came from were ascertained without delay. They were situated in Counties Armagh, Tyrone, Monaghan and Down. A thorough examination (including, of course, "mouthing") of all the animals which could have come in contact with the 73 which were exported was made, without discovering any case of foot-and-mouth disease.

At the request of the Department the Board of Agriculture and Fisheries forwarded to Dublin the tongue and lips of the first bullock detected, as well as the lips of the remaining 4 cattle said to be affected. These were examined by four of the Department's inspectors, all of whom are veterinary surgeons of considerable experience, and these officers reported that they failed to find any lesions on them which they would consider to be those of foot-and-mouth disease. The tongues showed elevations and peeling off of the surface epithelium, but these were not, in the opinion of the four veterinarians who examined them, of the character met with in foot-and-mouth disease.

Precautionary Movement Restrictions.

On locating the places of origin of the Newry-Birkenhead cargo, the Department considered it necessary as a precaution, pending the verification or otherwise of the existence of foot-and-mouth disease, to place movement restrictions on a large district surrounding the suspected localities. This district comprised County Armagh, and contiguous parts of Counties Tyrone, Monaghan and Down.

Special Movements on Licence.

Arrangements for allowing special movements on licence into and within this large district were, however, made with the object of mitigating the hardship which the restrictions brought on stock-owners. Movements were licensed for the purposes of breeding, feeding, or immediate slaughter, after a careful

veterinary inspection of the animals intended to be moved and of any animals in contact with them. The services of the veterinary inspectors of the Local Authorities were enlisted for the work of inspection. Licences were granted for movements from one place to another within the scheduled district, or from places outside the district to places within it, but no licences were given for movements out of the district. This system of licensing continued in operation until the restrictions on the Armagh scheduled district were modified on the 16th December.

The Question of Portal Inspection at Newry.

In connection with this shipment people naturally asked how it came about that animals with disease marks on the tongues passed the Portal Inspector at Newry. Questions were addressed to the Vice-President in the House of Commons on the subject, which pointed to the fact of the suspicious case at Dublin port having been detected, while these were not noticed. The matter is easily explained. The animals shipped from Newry were fat cattle, and in accordance with the arrangements which had been made with the Board of Agriculture and Fisheries, it was not then the practice to "mouth" fat cattle, which were intended for slaughter immediately after arrival at the foreign animals wharves. "Mouthing" was confined to store cattle, which would be moved, after a period of quarantine, to other places in Great Britain. The animals detected at Dublin were stores, and the suspicious appearances on their tongues were discovered during "mouthing." The fat cattle shipped at Newry were under the observation of the Portal Inspector—a veterinary surgeon of twenty-eight years' experience—for more than three hours, but none of them exhibited any external symptoms of disease.

The Londonderry–Glasgow Cases.

The suspected cases at Birkenhead were followed on the 12th December by the discovery of similar conditions at Glasgow in three heads of cattle which had been shipped as offal from Londonderry on the 10th December. These heads were forwarded to the Board's laboratory by their Veterinary Inspector at Glasgow, and on examination the Board's Chief Veterinary Officer pronounced the lesions appearing in the heads to be those of foot-and-mouth disease. Inquiries as to the origin of the animals to which the heads belonged were put in train by the Department forthwith. It was ascertained that the three animals had formed part of a consignment of 93 forwarded for shipment to Londonderry from places in Counties Donegal, Leitrim and Fermanagh. Owing to the embargo on exportation consequent on the Birkenhead cases, the animals were not shipped alive, but were slaughtered in Londonderry abattoir, and the carcases and offal exported. All the animals found on



Machines used for liming the land.



" Mouthing " a suspected animal.

the plaees from which the 93 cattle eame were carefully examined by veterinary inspectors of the Department, but in no instanee was any traee of foot-and-mouth disease diseovered.

The parts of the three heads were forwarded by the Board to the Department for inspeetion. They were examined by several of the veterinary inspectors and by Professor Mettam. All these gentlemen agreed that the tongues and lips did not exhibit lesions of foot-and-mouth disease, and that the ailment affecting these three cattle was identical with that found in the cattle sent from Newry to Birkenhead and in the eattle at Luggyvallen mentioned below.

The "Peeling-Tongue" Cases at Armagh.

In the process of inspeeting the animals on farms from which the cargo shipped from Newry came it was found that four out of seven cattle on a farm at Luggyvallen, near Armagh, showed a peeling off of the surface epithelium of the mouth of the same kind as that observed on the tongues and lips of the cattle detected at Birkenhead. It was from this particular farm at Luggyvallen that one of the eattle found diseased at Birkenhead came. These animals were examined by five veterinary inspectors and by Professor Mettam. At the time of inspeetion six of the seven cattle were affected in the manner described. There were brown-eoloured markings on the tongues, and a thin layer of surfaee epithelium was peeling off in patches from the tongues, and in some cases also from the lips, without, however, exposing the corium in any plaee. No vesicles appeared, and no soreness of the tongues or other parts of the mouths. The affection eould not be observed without opening the animals' mouths. There were no feet lesions. Constitutionally the cattle showed no change from their normal and natural state, and they did not seem to be inconvenieneed in any way by this ailment. It was agreed by all the veterinary surgeons who examined them that these cattle were not subjeets of foot-and-mouth disease. A similar condition of the mouths was found in two cattle on a farm near Loughgall, County Armagh, which was also the plaee of origin of one of the affeeted animals sent to Birkenhead.

In order to test more fully the view that this affcetion was not foot-and-mouth disease, experiments were made on other animals with material taken from the mouths of the cattle at Luggyvallen and Loughgall. These experiments resulted in the production of the same condition in the mouths of some of the inoculated cattle, but no foot-and-mouth disease lesions, nor any constitutional disturbance, resulted. Having regard to the faet that foot-and-mouth disease is an eruptive fever characterised by the production of vesicles, it is signifieant that no fever was produced and no vesieles formed in any animals during the experiments, and further that sheep and pigs experimented on did not reaet.

It is important also to note that on the 1st January a veterinary inspector of the Board of Agriculture and Fisheries visited Armagh and saw some of the affected cattle. He expressed the opinion that the conditions appearing in these animals were not those of foot-and-mouth disease.

Further light as to the nature of the disease affecting these cattle came from statements made by local veterinary surgeons who had been for a considerable time extensively in practice in the north of Ireland. Three of these gentlemen stated (and the fact was confirmed by one of the Department's inspectors who had before his appointment been in practice in the north) that they had for years met with this condition in cattle, and that, so far from being regarded as foot-and-mouth disease, it was looked upon as an ailment of so trivial a nature that veterinary aid was seldom sought in connection with it.

The British Board of Agriculture's Protective Measures.

The successive measures taken by the British Board of Agriculture and Fisheries to protect Great Britain against infection of foot-and-mouth disease from this side of the Channel moved concurrently with the events in Ireland which have been recounted, but for facility of statement and reference they are grouped together here.

Total Prohibition of Landing in Great Britain.

On the discovery of foot-and-mouth disease in Liverpool amongst animals of Irish origin, the Board of Agriculture and Fisheries immediately prohibited, by an Order dated the 28th June, the landing at any port or place in Great Britain of cattle, sheep, goats or swine brought from Ireland. The Department had themselves taken a similar prohibitive step as regards landing in Ireland of animals from Great Britain, on the 24th June, on receipt of intimation of an outbreak of the disease at Penrith in Cumberland. This action was followed by both Departments by a prohibition of the landing of hay and straw. For some time, therefore, all movements of animals between Great Britain and Ireland were suspended, and for a much longer period—extending to upwards of seven months—all movements of hay and straw between the two countries were stopped. But in the case of the export of animals from Ireland to the British markets, on which the cattle trade of this country so greatly depends, so extreme a course as the total stoppage of the export trade could only be justified as a temporary expedient. This fact was recognised by the British authorities as well as in Ireland, and consequently, before any long period had elapsed, arrangements for a partial resumption of the live-stock traffic from Ireland to Great Britain came under consideration. These arrangements were pursued throughout the whole period of foot-and-mouth disease in Ireland, and

though the entire question assumed before long a complex and difficult character, it was found possible to maintain, with some temporary interruptions, a gradually widening system, modified and adjusted to meet the shifting conditions of the time. A brief review now follows of the successive steps in the progress of these dispositions.

Modifications of the Embargo on Landing in Great Britain.

The first modification of the complete embargo was brought to pass on the 8th July, when, after consultation between the Board of Agriculture and Fisheries and the Department, shipments of fat cattle, sheep and swine from the ports of Belfast, Cork, and Londonderry were permitted to take place to the Foreign Animals Wharves at Glasgow, Birkenhead and Bristol for slaughter at those wharves. Animals were only permitted to leave the Irish ports above mentioned after a specially close and rigid examination by the Department's portal veterinary inspectors, and the shipments were conditional on accommodation being available for the animals at the ports of destination. On landing, the animals were subject to the very stringent provisions of the Board's Foreign Animals Order of 1910, which require, on prescribed lines, careful disinfection of persons and cleansing and disinfection of pens and vessels, feeding and isolation of the animals, and veterinary examination and regulation of their movement by an inspector of the Board. This partial relaxation of the embargo afforded a very scanty measure of relief to the trade, and the limited accommodation available at the Foreign Animals Wharves led to constant delays and inconvenience in getting away from the Irish ports. It had been intended at first to include Waterford amongst the ports from which these shipments might proceed, but the prohibition on that port was temporarily continued by the English Department on account of the suspected case of the head erroneously supposed to have been sent from Waterford to Liverpool.

On the 11th July Westport and Sligo were added to the list of Irish ports from which animals might be shipped; on the 20th July Deptford was included amongst the wharves at which landing from Ireland was permitted; on 17th July, Limerick, Waterford, and Wexford were added to the Irish ports, Ballina, Milford, Mulroy, Colcraine, and Portrush on the 22nd July, Dundalk and Newry on 5th August. In consequence of the outbreaks of disease in County Meath, Dundalk was withdrawn from the list on the 14th August; and shipments from that port were not resumed until 2nd October.

Shipment of Fat Animals from Dublin Port.

On the 19th September a new arrangement, by which shipments from the port of Dublin were resumed to a limited extent on certain conditions, came into operation. This arrangement

was only concluded after prolonged and complicated negotiations, for the purpose of which the Secretary of the Department proceeded to London and was in consultation with the Secretary and other officers of the Board of Agriculture and Fisheries for about ten days. It was agreed that fat cattle, sheep and swine should be exported from the port of Dublin for slaughter at the Wallasey Dock, Birkenhead, and the Foreign Animals Wharf at Deptford. Very complete precautions were planned to ensure that no animals exported should come from infected districts. All the disease centres in Counties Dublin, Meath and Louth were, in lieu of the larger scheduled districts previously existing, enclosed within five separate prohibited areas (viz. :— the areas which had already been scheduled as regards movements of hay and straw) into, out of and within which all movements of animals were forbidden. With cordons of police guarding these areas the isolation of the disease centres was effectually secured. Then a large scheduled zone was declared, comprising the Dublin County Borough, Counties Dublin, Meath, and Louth, and parts of Counties Armagh, Monaghan, Cavan, Westmeath, and King's County, and it was from this zone only, except of course the five prohibited areas, that animals shipped from the port of Dublin were drawn. The boundaries of the zone were so placed that it should extend to at least fifteen miles from any centre of disease. The country was thus divided for exportation purposes into two parts. From the first of these—the large scheduled zone just referred to—export of animals was allowed, *via* Dublin port, on the conditions described below. From the remainder of the country (with the exception of the fifteen miles scheduled districts round the infected places in Counties Kildare, Wicklow and Fermanagh, which remained intact) shipments for immediate slaughter took place on the conditions of inspection, etc., already mentioned. That this demarcation might be effective, all movements of animals out of the scheduled zone, except for export under the prescribed regulations, were debarred. This embargo, together with the fact that the scheduled zone extended to fifteen miles from any infected place, formed a fully sufficient guarantee that no animals coming from the neighbourhood of disease should be shipped from ports outside the zone on the less circumscribed conditions there applying. The conditions of exportation of animals from Dublin port were as follows :—Animals from the scheduled zone could only come to the port for shipment from a market or fair specially licensed by the Department. No markets or fairs not so licensed might be held. Veterinary inspectors attended these licensed markets, and examined all animals intended for export. No movement to the port for shipment might be made without a certificate of freedom from disease, granted by an inspector as a result of his examination, and a further veterinary examination was again required at the port before the animals were put on board ship. Cattle markets were held at

Dublin, Drogheda, and other places, for the sale of fat animals for shipment under these regulations. On the 2nd October Drogheda and Dundalk were opened for shipment on the conditions attaching to Dublin.

Opening of Other Ports.

But this somewhat cumbrous arrangement was not intended for anything more than a temporary expedient, and by the 7th October it was found practicable to abolish it. The British Board consented as from that date, in view of the favourable position in the affected counties in Leinster, to place Dublin, Drogheda and Dundalk on the same footing as the other Irish ports. The large scheduled zone, therefore, disappeared, while the small prohibited areas round the infected places were rigidly maintained. With the exception of these prohibited areas, and the two districts at that date scheduled in Counties Kildare, Wicklow, Fermanagh and Cavan, movement of fat animals for immediate slaughter was authorised to all the Irish ports already open,* for shipment to Birkenhead, Bristol, Deptford, and Glasgow.

Shipment of Store Cattle.

At the same time the Board of Agriculture and Fisheries consented to a limited scheme for the shipment of store cattle. On the 7th October an Order of the Board came into force which provided for the shipment of store cattle from Belfast, Cork, Dublin, Londonderry and Waterford to special landing places at Manchester, Birkenhead, Cardiff, Hull and Newcastle-upon-Tyne.

The precautionary regulations applied on both sides of the Channel to these consignments of store cattle were very strict. In Ireland consignors were obliged, in accordance with an Order of the Department, to make a declaration of the number and description of cattle consigned, and of the names and addresses of the previous owners. It was required that this declaration should accompany the cattle to the port of shipment and be delivered up to an inspector of the Department there. At the same time new conditions for the exportation not only of store cattle, but of animals generally, were imposed. It was provided by the Department's Order that on arrival at the Irish port or place of shipment all animals should be detained for not less than two hours for rest, feeding, and veterinary examination. This veterinary examination included the process of "mouthing." At the expiration of the detention period each animal was again inspected separately by the veterinary inspector, and no animals were allowed to leave the place of inspection for shipment unless the inspector was satisfied that they were free from disease and had given a certificate to that effect. There were

* That is, Ballina, Belfast, Cork, Coleraine, Dublin, Drogheda, Dundalk, Limerick, Londonderry, Milford, Mulroy, Nowry, Portrush, Sligo, Waterford, Westport and Wexford.

also requirements as to branding or other marking of the animals after inspection, and provision of food and water for the use of the animals during the period of detention. These regulations are now permanently in force. The stricter conditions of inspection entailed have naturally necessitated a considerable strengthening of the Department's staff of veterinary inspectors at the Irish ports.

On arrival at a British port, the store cattle were required by an Order of the British Board to be detained in a reception lair at the landing place, under veterinary observation, for 96 hours from the time of departure from Ireland of the vessel in which they were consigned, and were not allowed to leave the lair until a veterinary inspector of the British Department had given a certificate that all the cattle then in the landing place were free from foot-and-mouth disease. The provisions of the Foreign Animals Order of 1910 as to cleansing and disinfection were enforced in these cases. On leaving the landing place they were moved on licence to another place of detention—and were there kept in isolation under veterinary supervision for a further period of 21 days. These conditions have since been materially altered. The 96 hours period at the landing place has been changed to 10 hours, and the further 21 days isolation has been abolished.

This scheme afforded only a very narrow outlet to the store cattle trade, on account of the very small number of British landing places which could be availed of, and the meagre accommodation for cattle they furnished. The limitations under which exporters of store cattle laboured may be estimated when it is stated that there is accommodation at the prescribed landing place at Wallasey, Birkenhead, for no more than 2,000 cattle, at Manchester for 2,000, at Cardiff and Hull for 400 each, and at Newcastle-upon-Tyne for 600. Hull and Newcastle being out of the line of Irish sailings, no cargoes were sent to those ports, and the scheme was in this respect of no utility. At the other three ports it was only possible with the accommodation available to land cattle every seventh day.

The outbreak of the disease at Mullingar led the British Board to take as a precaution the step of altering the quarantine period at the authorised British ports from 96 hours to fourteen days. This extended period of quarantine was maintained from the 21st October until the 28th November, when it was again brought back to 96 hours.

The Importation of Sheep from Scotland.

On the 7th October also a reciprocal Order of the Department came into force which allowed the importation of sheep from Scotland to be renewed on certain conditions designed to secure that infection of foot-and-mouth disease should not be conveyed to Ireland by any such importations. A statutory declaration was required from the original owner of the sheep, that for two



Inspection at the Irish ports. " Mouthing " cattle previous to shipment.



Portal inspection : Cattle passing singly before inspectors prior to being finally passed for shipment.

months preceding their movement, he had not had in his possession any animal which had been in England or Wales, or in the counties of Scotland bordering on England, and that within that period no case of foot-and-mouth disease or other contagious disease had existed on his premises. A certificate was also required from the veterinary inspector to the Local Authority that all the animals on the owner's premises were free from foot-and-mouth disease, and likewise a certificate from the Chief Constable that the county or borough in which the premises were situated had been immune from the disease for two months. These importation arrangements are, with some modifications, still in force.

Further Modifications of the Embargo.

On 28th October a Foreign Animals Wharf at Bristol was opened to receive Irish store cattle. On 2nd November four more Irish ports—Drogheda, Dundalk, Newry and Sligo—were included amongst those from which shipments of store cattle were allowed. From the same date provision was made for the landing and slaughter of Irish sheep at the Foreign Animals Wharf at Cardiff, and for the landing and slaughter of fat cattle, sheep, and swine at Manchester Foreign Animals Wharf. A few days later Cardiff was also opened to fat cattle and swine as well as sheep, and Holyhead to both stores and fat cattle. On 8th November Greenore was opened for shipments of fat cattle, but no shipments took place from Greenore to Holyhead until 2nd January, 1913. The London and North Western Railway Company were not in a position to receive swine at Holyhead until 8th March. Westport (already open for fat animals) was opened for the shipment of stores on the 9th November, and on the 14th, a second wharf at Bristol was opened for the reception of both store cattle and fat animals. A week later, under an Order of the Board consolidating and amending the previous provisions, shipments of store cattle from Ballina, Limerick, and Wexford were allowed to be resumed, and all the British landing places named above were scheduled together as open for the reception of both fat animals and store cattle, with the exception that at the Foreign Animals Wharf at Deptford, no store cattle and no swine intended for slaughter elsewhere than at the landing place, were received. The Order making this provision also provided that swine might be moved from a landing place after 14 days' quarantine to a specified slaughter-house or bacon factory. On 28th November an Order of the British Board authorised shipments to Dundee. The port of Glasgow, although scheduled by the Board for the landing of fat animals, was for a long time closed to stores by the action of the Port Authority, who were unwilling to receive Irish cattle, in the fear of introducing disease into Scotland. It was not until the 2nd December that the Glasgow Port Authority consented to allow Irish store cattle to be landed

at their port. A few cargoes were shipped to Dundee from Dublin and Belfast during the time when Glasgow was closed, but as soon as the latter port was opened, the only reason for undertaking the long sea journey to Dundee was removed, and consequently no further shipments to Dundee took place.

Embargo on Dublin Port.

These arrangements were interrupted by the discovery of the suspicious appearances in animals at the Port of Dublin on the 28th and 30th November, in consequence of which the Board of Agriculture and Fisheries intimated on the 2nd December that they had instructed their inspectors not to issue licences for the removal of Irish animals from landing places in Great Britain, pending further investigation of the two cases. They also stated that no further consignments of animals could be shipped from Dublin to ports in Great Britain until this investigation should be completed. In consequence of this announcement shipments of animals from Dublin port were suspended on the afternoon of 2nd December.

The Department made representations to the Board pointing out that the circumstances did not justify the continuance of the embargo that had thus been temporarily placed on the port of Dublin and on the Irish cattle trade, or further interruption of the arrangements which had been settled for the export of Irish live-stock to Great Britain.

As a consequence of the action of the Board of Agriculture and Fisheries, the Department considered it advisable on the 4th December to issue an Order prohibiting the holding of the usual Dublin Metropolitan Market that week. They also found it necessary to require that the Dublin Winter Show of Fat Stock held on the 11th December should not receive any exhibits from Counties Meath and Louth. This precaution was taken in view of the suspicion attaching to those counties, from the fact that some of the animals in the Dublin cargoes had come from the northern part of County Meath.

Total Suspension of Shipments.

Then, on the 4th December, there came the cases at Birkenhead, on account of which the Board of Agriculture and Fisheries took the very drastic step of totally suspending the landing of animals from Ireland at British ports. In explanation of their action the Board stated that they felt it incumbent upon them to issue an Order to the effect mentioned, pending the institution by the Department of enquiries as to the places of origin in Ireland of the animals in question, and the discovery, if possible, of the unknown disease centre which the Board considered must apparently have existed then in this country.

Resumption of Shipment of Fat Animals: The "Danger Zone."

At the earliest practical moment after this event, the Department entered into negotiation with the Board respecting the modification of this embargo. As the result, an arrangement was brought into operation on the 11th December by which, while the export of stores still remained under prohibition, the shipment to Great Britain of fat animals for slaughter in the landing places was resumed, except from a large area or "danger zone" out of which movement of animals was, by an Order of the Department, prohibited. This "danger zone" comprised a wide region, extending from County Meath to the southern part of County Antrim. It embraced portions of Counties Down, Antrim, Tyrone and Cavan, the whole of Counties Armagh, Monaghan, Louth and Meath, and part of County Westmeath, and included the ports of Drogheda, Dundalk, Greenore and Newry, from which of course no shipments could take place. The wide extent of this zone was due to the fact that the British Board, believing that foot-and-mouth disease existed in Ireland at some centre or centres not discovered, thought it necessary to require that no animals should be sent to Great Britain from any districts which the Board were not confident were free from disease, and fixed the boundaries of such districts at fifteen miles from the places from which the animals forming the suspected cargoes had come. It was therefore necessary to schedule an area having a radius of fifteen miles or upwards from the places of origin in Counties Armagh, Tyrone, Monaghan and Down of the cattle shipped from Newry, and from the original homesteads in County Meath of the two consignments amongst which suspected animals were found at Dublin port.

The incident of the suspected heads at Glasgow on the 12th December led to an alteration of the scheduled "danger zone." County Louth and the parts of Counties Down, Antrim and Cavan previously scheduled were now omitted, there being no longer any reason to suppose that disease existed anywhere in these localities. A small part of County Donegal, south of the railway line running from Lifford *via* Stranorlar to the town of Donegal, and the whole of Counties Londonderry and Fermanagh, were brought in as being the sources of the consignment of 93 cattle sent to Londonderry. The new zone therefore comprehended the southern corner of County Donegal referred to, and Counties Londonderry (including the County Borough), Tyrone, Fermanagh, Monaghan, Armagh, Meath, and Westmeath.

(During the continuance of restrictions on movement of animals out of this scheduled zone, the Department arranged, as a means of partially meeting the needs of breeders of fat stock in County Meath, to allow upon licence the movement of fat cattle from that county to the Dublin abattoir for immediate slaughter.)

Movements on Licence for Slaughter.

By the 21st December it was found possible to arrange with the British Board for a relaxation of the restrictions as regards portion of the very extensive zone to which reference has been made. The scheme agreed on allowed animals to be moved for immediate slaughter to slaughter-houses or bacon factories in Ireland, or to an Irish port for shipment to Great Britain for slaughter in an approved landing place, from Counties Westmeath (save the small part of it round Mullingar scheduled on account of the outbreaks there) Monaghan and Tyrone, and from County Londonderry, with the exception of the City of Londonderry and a portion of the county, described in the Department's Order, having a radius of about five miles from the city. All movements from the remaining portions of the zone were still precluded.

In cases of movement to a slaughter-house or bacon factory the regulations demanded that the animals should be moved only when accompanied by a movement licence granted by an inspector of the Department or other authorised officer, that they should travel by a route specified on the form of licence, should during their movement be kept separate from all animals not being similarly moved on licence, and should be slaughtered within four days of their arrival at a slaughter-house or bacon factory.

Animals in course of movement to a port for shipment to Great Britain for slaughter had also to be isolated from other animals, moved by the shortest available route, and could only be licensed for shipment on a vessel conveying animals intended for slaughter and no other animals. Arrangements were made by the Department for the issue of movement licences at all the Constabulary Stations within the areas from which the movements were allowed.

Shipment of Stores Resumed.

At the same time shipments of both fat animals and store cattle were again authorised from all parts of Ireland outside the scheduled zone, to Bristol, Deptford (fat stock only), Glasgow, Manchester, Birkenhead, Cardiff, Hull, Newcastle-upon-Tyne, Holyhead and Dundee. Store cattle were subject to detention at the landing place for 96 hours from the time of departure from Ireland of the vessel carrying them.

Removal of Restrictions.

On the 1st January, after a conference at the offices of the Board of Agriculture and Fisheries, at which the Department represented that they could no longer properly entertain the suspicion that the Armagh and Newry cases were foot-and-mouth disease, and would not be justified in continuing restrictions on the Irish cattle trade based on that theory, the Department removed the restrictions from Counties Londonderry,

Tyrone, Monaghan, and Meath, and from Counties Fermanagh and Armagh, with the exception of the Parliamentary Divisions of North Fermanagh and Mid-Armagh. These Parliamentary Divisions, together with the small southern portion of County Donegal referred to, were retained under restrictions by desire of the Board, as being the localities most suspected in connection with the shipments from Newry and Londonderry. The effect of this action was to allow shipments from the excepted counties on the same conditions as then applied to the unscheduled parts of Ireland. The arrangement for movement for slaughter in Ireland or at a British landing place continued in force as regards County Westmeath.

On the 7th January the Department were able, with the consent of the Board, to annul the restrictions imposed on the two Parliamentary Divisions mentioned, and on the southern part of County Donegal and County Westmeath except the small scheduled area round Mullingar.

The port of Larne had, on the 21st December, been placed on the lists of ports from which both fat animals and store cattle might be shipped, and Coleraine had been added to the list for store cattle shipments on 3rd January. On that date also the period of quarantine was altered, in the case of fat swine, from 96 to 12 hours, and on the 11th January the reduced period of 12 hours was applied also in the case of store cattle, the 12 hours being reckoned from the time of landing of the last animal in the cargo. Shipments of store cattle from the small ports of Milford, Mulroy and Portrush were authorised on the 18th January. On the 21st of that month arrangements were completed for the landing of Irish animals, both fat and store, at the port of Ayr.

At the end of the month the Orders prohibiting movements of hay and straw between Great Britain and Ireland were withdrawn by both Departments.

The British Board's "Animals (Landing from Ireland) Order of 1913."

The arrangements for shipment of Irish animals to Great Britain have, so far as landing and movement on arrival there are concerned, since been co-ordinated and incorporated in a single Order of the Board of Agriculture and Fisheries—the Animals (Landing from Ireland) Order of 1913—which came into force on the 30th January.* This Order provides for the shipment of animals from all the customary cattle shipping ports in Ireland to special landing places in Great Britain defined by Orders of the Board, and set apart specifically as landing places for Irish animals. These landing places are

* This Order has since been modified by a further Order of the Board, which came into operation on the 7th June, 1913. In accordance with the latter Order, the period of detention has been reduced to ten hours, and three additional landing places have been provided, viz. :—Barrow-in-Furness, Heysham, and Fishguard.

situate at the ports of Birkenhead, Manchester, Holyhead, Fleetwood, Bristol (two landing places), Cardiff, Deptford, Glasgow, Ayr and Dundee. The shipment of sheep and swine for store purposes as well as cattle is permitted under this Order. On arrival at a landing place the animals are detained under veterinary observation for the prescribed period of twelve hours, which is reckoned from the time of landing of the last animal of the cargo, and during this period they are kept from contact with all other animals. A proper and sufficient supply of food and water is required to be provided by the occupier of the landing place for the use of the animals during detention. The occupier is entitled to charge the owners for food supplied, at rates fixed by the Board. After the animals have been discharged they must again be supplied by the owners or consignees with sufficient food and water. The Order lays down the procedure to be adopted in case of discovery of cattle-plague, pleuro-pneumonia, foot-and-mouth disease, or sheep-pox, in animals at a landing place, and rules are also prescribed to govern cases of sheep-scab and anthrax. The Order also contains regulations regarding disinfection of the landing place, and of persons and clothes.

Swine exported from Ireland are, in addition to the provisions of the Order, subject to compliance with the Board's Swine Fever (Movement from Ireland) Orders of 1904 and 1906.

Success of Department's Measures in Preventing Spread of Disease to Great Britain.

In connection with this matter of the varying arrangements for the shipment of Irish cattle to Great Britain, one significant fact is worthy of special notice. During the period of foot-and-mouth disease in Ireland, that is to say the last six months of 1912, 690,860 ruminant animals and swine were exported from this country to Great Britain. But in no single instance amongst all these thousands of animals was a genuine or established case of foot-and-mouth disease found at any British port. This striking circumstance bears strong testimony to the thorough effectiveness of the Department's measures for confining the disease within the scheduled areas, and preventing the spread of contagion to other parts of Ireland or to Great Britain.

The Cost to the State of the Foot-and-Mouth Disease Operations.

The varied activities which fell to the Department in combating and eradicating foot-and-mouth disease cast a very considerable expenditure on the Department's funds. The sum provided in the original estimates for the year 1912-13, laid before Parliament, to meet expenditure—other than on swine-fever work—incurred in carrying out the provisions of the Diseases of Animals Acts was the normal one of £200 only. It may be mentioned that in cases where expenditure is of a widely fluctuating character, such as that for foot-and-mouth

disease, and of a kind where it is impossible to foresee, at the time when the original estimates are framed, whether any expenditure whatever may be incurred, it is the practice of the Treasury to insert only a token provision in the original estimate.

It accordingly became necessary to obtain a supplementary estimate in January last to cover the net expenditure incurred. The gross expenditure at that time amounted to £45,500. The sale of carcases fit for food had realised £7,300. Deducting this amount from the gross expenditure, and deducting also the token provision of £200 in the original estimate, a balance of £38,000 remained, which was provided by means of a Supplementary Estimate.

The gross expenditure to 31st March, 1913, was £46,841. The sale of carcases of slaughtered animals fit for food realised £7,326, and miscellaneous receipts amounted to £77, leaving the net expenditure £39,438. The expenditure of £1,238 in excess of the £38,200 provided in the Parliamentary vote was met from the General Cattle Diseases Fund.

The principal items making up the gross expenditure of £46,841 were :—

Remuneration of *additional* veterinary inspection staff, numbering 30, and of local veterinary inspectors employed	£5,427
Travelling and maintenance expenses	6,824
Cost of slaughter of animals, burial, disinfection, liming of lands, dressing of carcases fit for food, cartage, and other miscellaneous expenses	6,410
Compensation to owners of slaughtered animals ..	28,030
Overtime of temporary clerks, messengers, etc. ..	150
	£46,841

Special Meetings of the Council of Agriculture.

The public interest aroused by the situation arising out of the outbreaks of foot-and-mouth disease, led to a special meeting of the Council of Agriculture being held on the 17th September to consider the position. The Vice-President delivered an address in which he dealt with the situation generally and the Department's action in regard to it. After a full debate the following resolution was passed unanimously :—

" That this Council fully recognises the importance of the most thorough measures being taken for the suppression of foot-and-mouth disease, and the restoration to Irish live-stock of the clean bill of health which it has enjoyed without interruption for the past twenty-seven years. They consequently desire to support the Department in such measures as they find it necessary to take towards this end, and they bespeak the continuance of the co-operation which the

farmers and all concerned have hitherto given to these measures in spite of the loss and difficulty which such restrictions have involved.

"At the same time the Council are of opinion that these measures have now been completely effective in eradicating the disease from the centres in which it occurred in the counties of Dublin, Meath, and Louth; and that there is no further justification for the restrictions which are still placed upon the shipments of live-stock, whether fat or store animals, to British markets from these counties.

"Furthermore, that as in the whole of Munster and Connacht, and the greater part of Ulster, no foot-and-mouth disease at all appeared, there is no justification whatever for any restriction upon the shipment of fat cattle or stores from these parts of the country; and as these restrictions inflict most grievous injury and loss, amounting in its proportions to a national calamity, the Council urge upon the Government to remove them, and at least to accord the same facility of movement and markets for healthy Irish live-stock—fat and store—coming from non-infected areas as those allowed to live-stock from similar areas in Great Britain, so as to permit the resumption of our trade upon its normal conditions without further delay."

The Dead Meat Trade: Mr. Gill's Statement.

A paper was read at this meeting by the Secretary of the Department, Mr. Gill, on the relation of the dead meat trade to the fat stock trade, with special reference to the crisis then existing in the live-stock industry. Mr. Gill had made a special investigation of this subject, having visited Deptford for the purpose, and interviewed in Dublin and London representatives of the London dead meat market. The paper was discussed at considerable length.

The Second Special Meeting.

On the 21st January, 1913, another special meeting of the Council was held. This meeting was convened, at the request of a large number of members of the Council, to consider a resolution to be submitted by Mr. Hugh T. Barrie, M.P., on the subject of the proposed arrangements affecting Irish cattle at British ports. After long discussion the following resolutions, proposed by Mr. Barrie, and seconded by Mr. Robert Downes, J.P., were adopted unanimously:—

(1.) "That the Irish Council of Agriculture, specially convened to consider the intended permanent detention of Irish cattle at British ports for a minimum period of twelve hours, beg to enter a most emphatic protest against any such proposal. They believe it is unnecessary, will prove vexatious and costly in working, and in most cases be found detrimental rather than beneficial to the cattle themselves. They are

further of opinion that any such permanent discrimination against Irish cattle is totally unwarranted, must inevitably prejudice their market value, and tend to lessen legitimate competition. The cumulative effect cannot fail to inflict a crushing blow on Ireland's greatest agricultural industry.

"In making this protest the Council desire it to be understood that they take no narrow view of this problem. They recognise that British as well as Irish agriculturists are entitled to take every reasonable precaution against the spread of foot-and-mouth disease amongst their herds; and it is obviously desirable that, for shipments sent out of and coming into Ireland, adequate provision against the danger of disease and for securing the health and humane treatment of the animals should be made. But these provisions ought not and need not be of such a nature as to involve grievous detriment to the industry in whose interests they are supposed to be taken. Both Irish producers and British purchasers of Irish live-stock have, in the opinion of the Council, a common interest in the solution of this problem, and the Council respectfully urge and confidently hope that the Agricultural Departments concerned will work out a solution on this basis."

(2.) "That copies of the foregoing resolution be sent to the Prime Minister, the President of the English Board of Agriculture, John E. Redmond, Esq., M.P., the Right Hon. Sir Edward Carson, K.C., M.P., and all other Irish Members of Parliament."

The following resolution was also passed unanimously:—

"That this meeting of the Council of Agriculture for Ireland, recognising the great and prolonged strain upon the Department and their Veterinary Officers during the late outbreak of foot-and-mouth disease in Ireland, hereby records its high appreciation of the competence, promptitude and success with which they have brought about the eradication of the disease in Ireland."

The Assistance of the Police Forces.

The Department desire, before closing this record of work done in connection with foot-and-mouth disease in 1912, to refer particularly to the valuable assistance which they received from the Royal Irish Constabulary and the Dublin Metropolitan Police. The duty of enforcing the manifold regulations laid down by the Department's Orders was necessarily committed to the police. This difficult work was executed with great diligence and skill. In this and all other connections where the co-operation of the police could be of service, their ready and capable aid was, with the consent of the Inspector General of the Royal Irish Constabulary and the Chief Commissioner of the Dublin Metropolitan Police, generously accorded. The Department were fortunate in having available during this critical

time the resources of these very efficient corps, and they place on record with much pleasure their indebtedness to the two police forces for their strenuous and unsparing exertions, without which the success that attended the Department's efforts for stamping out the disease could not have been attained.

In dealing with outbreaks of contagious disease amongst animals in Ireland the Department possess a great advantage, which is not enjoyed by the British authorities, in the existence of a strong police force under central government control. The fact of there being such a force, with adequate reserves and common to all counties, makes practicable, on request being made at headquarters, prompt movements of additional men to augment the normal strength at any disease centre, in a manner not so readily practicable with separate county forces such as are established in Great Britain.

The Death of Mr. Hedley.

One other matter is left for notice. The outbreak of foot-and-mouth disease in this country laid a heavy burden on the staff of the Department's Veterinary Branch. The normal work of the branch was redoubled. The staff proved equal to their task. But early in September, after several weeks of anxious and exacting work, Mr. Matthew Hedley, F.R.C.V.S., Chief Veterinary Inspector, broke down in health, and was obliged to relinquish duty. He never more than partially recovered, and on 31st January he passed away. Mr. Hedley had been officially connected with veterinary administration in Ireland for upwards of thirty years, and the eminent part which he played during that long period in furtherance of departmental measures for suppressing animal diseases, and compassing the well-being of Irish live-stock, is gratefully remembered in this country. The Department record with sorrow their deep sense of the loss they have sustained through Mr. Hedley's death, and it is a melancholy reflection that his share in the work described in these pages doubtless hastened his end.

APPENDIX A.

Report of Mr. D. S. Prentice, m.r.c.v.s., Chief Veterinary Inspector.

To the Secretary, Department of Agriculture and Technical Instruction for Ireland.

Sir,—In considering the circumstances connected with the recent series of outbreaks of Foot-and-Mouth Disease in Ireland, and having regard to the fact that the disease appeared on 68 places within a period extending from the 30th June to the 7th November, 1912, it would seem convenient for the purpose of reference to group these places according to the counties in which the disease occurred and the dates when the outbreaks were discovered, each infected place being regarded as a separate outbreak, thus :—

Group No. 1.—Comprises 21 outbreaks in and around the village of Swords, in the County of Dublin, at Clinstown, Ardmulchan, and Rathcore, in the County of Meath, and at Tullykeel, in the County of Louth.

These outbreaks were discovered during the period from the 30th June to 14th August.

Group No. 2.—Comprises 5 outbreaks which occurred respectively at Corravehy, Clonfane, Drumhervin, Stumpy Hill, and Laragh, in the County of Fermanagh.

These outbreaks were discovered during the period from 27th August to 5th October.

Group No. 3.—Comprises 5 outbreaks at Ballysax, Kinneagh, and Sunnyhill, in the County of Kildare, and at Lugatryna and Dunlavin Upper, in the County of Wicklow.

These outbreaks were discovered during the period from 27th August to 1st October.

Group No. 4.—Comprises 37 outbreaks in and around Mullingar, in the County of Westmeath.

These outbreaks were discovered during the period from 18th October to 7th November.

In dealing with the disease as it arose at each centre the duties cast upon the Veterinary Staff were exceptionally heavy, a distinct and separate Staff of Inspectors being employed for each of the following purposes :—

(*a*) The carrying out of measures so far as infected places alone were concerned.

(*b*) The inspection and recording of animals on farms, etc., in the vicinity of infected places, as well as the tracing and examination of live-stock moved to other districts before the imposition of restrictions in the neighbourhood in which the disease appeared.

(*c*) The inspection of animals concerned in the necessary movement of live-stock on licence within or into the Scheduled districts, and

(*d*) In the case of Group No. 1 (County Dublin, etc.) the post-mortem examinations of animals in public abattoirs and slaughter-houses.

GROUP No. 1.

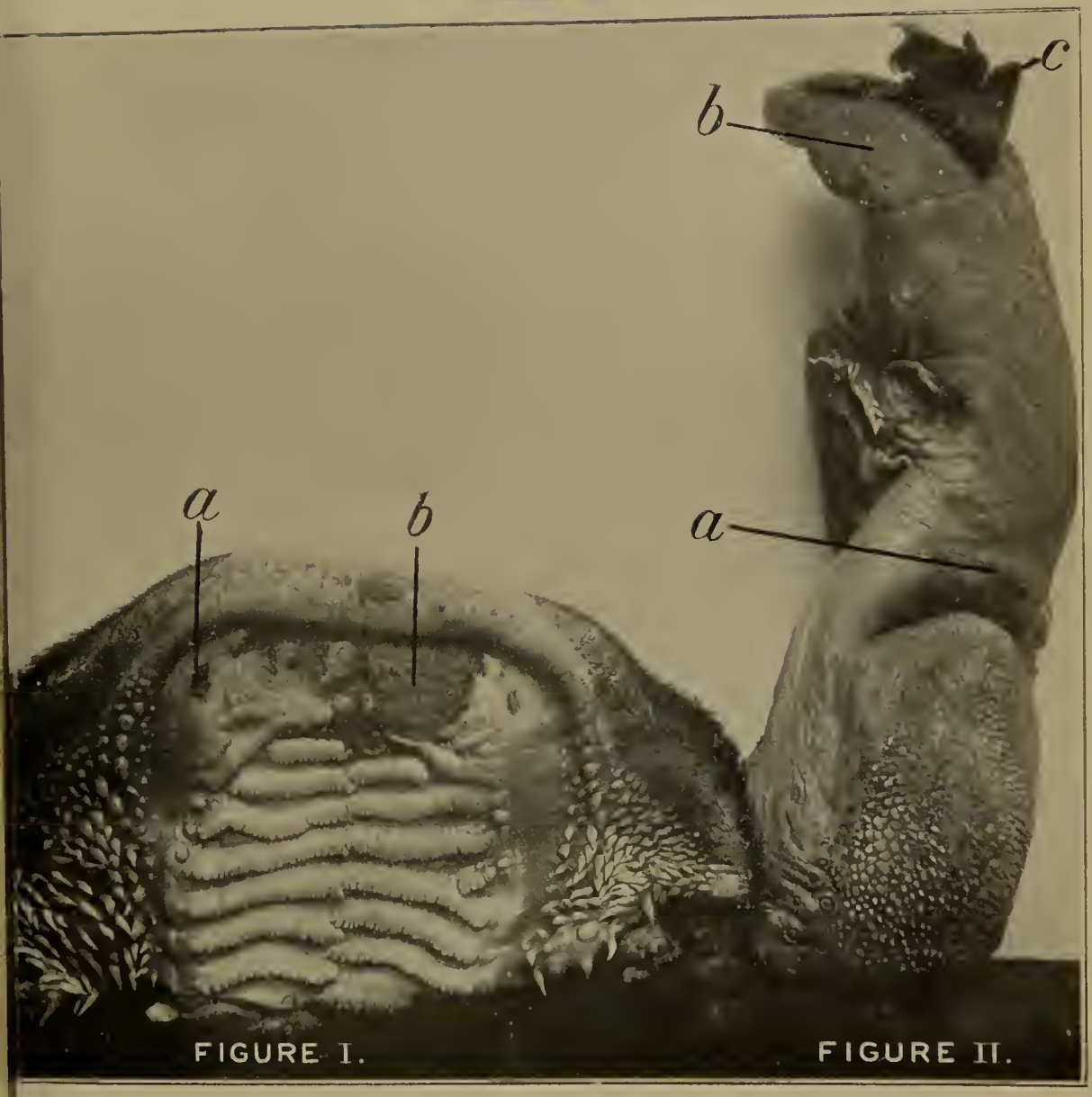
Number of infected places, ... 21
Number of animals affected with Foot-and-Mouth Disease, ... 215 Cattle, 1 Sheep
Number of animals (including diseased) Slaughtered, 1,257 Cattle, 1,081 Sheep, 26 Swine, and 16 Goats.

The initial outbreak of Foot-and-Mouth Disease in Ireland was discovered at Drynam, near Swords, on the 30th June, by one of the Department's Veterinary Inspectors, among a lot of 45 cattle. Twenty-four of these animals were found to exhibit well marked clinical symptoms of Foot-and-Mouth Disease, salivation, smacking of the lips and lameness being noticeable features. The disease was evidently well established on the farm, and had, it appears, been mistaken for Actinomycosis (Timber Tongue).

In this outbreak the affection was of a comparatively benign character. In some instances the fever stage of the disease had passed at the time of discovery, but lesions on the tongue, lips and feet of cattle were observable in different degrees of progression. These conditions ranged from newly formed and recently ruptured vesicles with the inflamed corium exposed (the epithelium in some instances still clinging to the edges of the raw surface) to rapidly healing lesions. The diseased cattle, in addition to the in-contact animals, were slaughtered without delay, and upon post-mortem examination further indications of the malady were observed in 12 others, making a total of 36 affected animals out of a herd of 45 cattle.

On the day following the discovery of the disease at Drynam further cases were reported and confirmed on lands within a mile distant from the first outbreak, and from that date onwards outbreaks occurred at intervals on farms in the vicinity until the 14th August, when the disease appeared on the seventeenth separate infected place. These outbreaks were no doubt of a secondary character. The district around Swords comprises extensive grazing lands which at the time were especially well stocked with animals, and the disease probably spread from farm to farm owing to their contiguity to each other or to the movement of persons from places before the affection was discovered thereon.

Eleven of the outbreaks were brought under notice for the first time by the Department's Veterinary Inspectors when examining live-stock on the farms throughout the district, but



URE I.—Dental pad and portion of palate of cow with Foot-and-Mouth Disease. *a*. Small ruptured vesicle. *b*. Erosion of mucous membrane, following rupture of vesicle.

URE II.—Tongue of cow with Foot-and-Mouth Disease. *a*. Unruptured vesicle. *b*. Large ruptured vesicle. *c*. Portion of epithelium still adhering after rupture of vesicle.

(GROUP No. 1.)



FIGURE III.—Foot of cow with Foot-and-Mouth Disease. *a*. Ruptured vesicle at inter-digital space.

(GROUP No. 1.)

while this was the case there were, on the whole, little grounds to consider that any desire existed on the part of owners of animals to conceal the disease when it appeared among their herds. In the case of two of the outlying places in the County of Meath where the disease was found to exist, local veterinary surgeons were first called in by the owners to examine suspected cattle, and, after arranging for precautionary measures, they communicated the facts to the Department. In the remaining instance in Meath where the disease appeared, and also in the case of the County Louth outbreak, the owners of the cattle reported the existence of the disease in the usual way, measures being taken to isolate the affected animals awaiting the decision of the Department.

No agency has been discovered which can definitely be said to have conveyed the infection from the Swords district to these outlying farms, but having regard to the fact that the virus of Foot-and-Mouth Disease may so easily be carried from place to place, the extension of the disease from the Swords centre most probably accounts for these outbreaks.

A large staff of the Department's Veterinary Inspectors were constantly employed in examining the animals on the farms for a few miles around Swords, and in the neighbourhood of the infected places in Meath and Louth, with a view to detecting the first appearance of disease on the lands, and in order that means might at once be taken to deal with any extension of the outbreak. This procedure, together with the prompt and stringent measures adopted at places known to be already infected, resulted in preventing the outbreak extending more rapidly than it did among the numerous herds of animals in the district.

The movements of animals from farm to farm were prohibited by special service of restriction notices, and a record was kept which would at once lead to the discovery of any animals taken from or added to these places, and while no general slaughter of all susceptible animals at the infected centres took place, the slaughter of the affected cattle, and those in contact which it was considered would most likely become diseased, was promptly carried into effect.

The thorough cleansing and disinfection of all premises where the disease existed, and the disinfection of all persons or things likely to convey infection, were rigidly enforced. Large quantities of hay and straw in stacks were on a number of the infected places, and, in a number of instances, it would appear that diseased animals had been in contact with them. The hay and straw were disinfected without damage by a special process of super-heated steam.

The disease varied in severity in these outbreaks. In some of the affected herds mouth lesions alone were noticeable, and the constitutional symptoms were on the whole not severe. In other instances, however, especially where milch cows were

concerned, the disease assumed an aggravated character, the invasion usually was rapid, erosions and other characteristic lesions were extensively noticeable on the mouths, feet, udders and teats (in milch cows), and the animals were reduced to a state of prostration. (Vide Figures I. to V.)

Nothing has been definitely discovered as to the manner in which in the first instance the disease was conveyed to Drynam, but various causes for its appearance have been assigned which upon investigation have proved to be without foundation. There was, however, a constant backward and forward movement of men engaged in the cattle trade between the district concerned and the live-stock markets in Great Britain.

Group No. 2.

Number of infected places, ... 5
Number of animals affected with Foot-and-Mouth Disease, ... 13 Cattle
Number of animals (including diseased) Slaughtered, 66 Cattle, 31 Swine, 6 Goats.

The initial outbreak of Foot-and-Mouth Disease in this Group was discovered at Corravchy by the local Veterinary Inspector in the course of his practice, and confirmed on the 28th August by the Department's officers. Two cattle in the herd were affected, and these with the in-contact animals were slaughtered. The first of the animals found to be diseased was a cow which had recently been to a bull in the neighbourhood, and in tracing the movements of other cows that had also been with this bull, three further cases of Foot-and-Mouth Disease were discovered by the Department's Inspectors on another farm in the district. Five additional cases occurred on the farm where the bull was located, and upon all animals on the place being slaughtered, the tongue of the bull was noticed to have a healed lesion such as would result from Foot-and-Mouth Disease.

Two further outbreaks of the disease were discovered in the district, one of which was reported by the owner, the other being found by a Departmental Veterinary Inspector when examining animals in the neighbourhood.

The disease as it appeared in this district was of a comparatively mild type. In the case of all the affected animals tongue lesions of the disease were present in one stage or other. (Vide Figure VI.) When seen by the Veterinary Inspectors, the constitutional symptoms had mostly subsided, but salivation was especially noticeable. The country where these outbreaks occurred consisted of small farms, and the animals grazing thereon were comparatively few in number. The farms in the neighbourhood of the infected places were constantly visited during the period of restrictions by Veterinary Inspectors of the Department, with a view to the early detection of any case of the



FIGURES IV. and V.—Dental pads and portions of palates of bullocks showing extensive erosions of mucous membranes, following rupture of vesicles, at *a*.

(GROUP No. 1.)



FIGURE VI.—Tongue of cow with Foot-and-Mouth Disease. *a*. and *a*. Erosions of mucous membrane after rupture of vesicles.

(GROUP No. 2.)

disease which might appear in animals thereon, and, in order that a check might exist on the possible movement of live-stock from or on to any of these farms, the usual records of animals found on each place were maintained.

Thorough cleansing and disinfection of each infected place (as far as was practicable) and the disinfection of all persons and things likely to convey the disease, was carried out under the supervision of the Department's Officers.

There is nothing to indicate how the disease was in the first instance brought into this district. The different outbreaks were, however, doubtless connected with each other. Most of the infected farms were comparatively near to one another, and considerable movement of live-stock had taken place in the vicinity before the initial outbreak was discovered.

Group No. 3.

Number of infected places, ... 5
Number of animals affected with Foot-and-Mouth Disease,
26 Cattle, 14 Swine.
Number of animals (including diseased) Slaughtered,
172 Cattle, 137 Sheep, 24 Swine.

The initial outbreak of Foot-and-Mouth Disease in this Group occurred at Ballysax, Co. Kildare, and was brought under official notice through the agency of a local veterinary surgeon, who was called in by the owner to examine sick animals on the place. The disease was confirmed by Departmental Officers on the 28th August. In all eight cattle and fourteen swine were found to be affected, and were slaughtered. The remaining animals on the farm, consisting of 17 cattle, 122 sheep, and 8 swine were also slaughtered, it being considered likely that the disease would extend to them.

On the 2nd September a report was received that a bullock was suspected to be affected with Foot-and-Mouth Disease at Kinneagh, a farm adjacent to Ballysax. The existence of the disease on this place was at once confirmed. There were 97 other cattle grazing on the farm, belonging to upwards of 20 different owners, and it was necessary to consider whether the circumstances were such that the disease would probably extend to any or all of these animals, but in the meantime measures were taken to isolate the herd as far as was practicable. On the 6th September, however, another bullock on the place showed lesions of the disease, and it was determined to slaughter the entire lot of animals on the farm. At the date of slaughter 15 cattle in all were attacked.

From Kinneagh the disease spread to an adjoining farm at Sunnyhill, where one bullock was found to be affected and was forthwith killed. On this farm and on adjoining land 35 other cattle and 11 sheep grazed. All of these animals were, as a precautionary measure, slaughtered without delay.

The disease also appeared at Lugatryna and Dunlavin Upper, in the County of Wieklow, distant about six miles from the County Kildare outbreaks. At Lugatryna the outbreak was reported by the owner and confirmed by the Department's Offieers, and at Dunlavin Upper the disease was diseovered by one of the Department's Inspeetors when examining live stoek on farms, the affeeted and in-eontaet animals being slaughtered.

The disease in County Kildare assumed a somewhat severe type ; the eonstitutional symptoms observable were well marked, and in many instanees lesions of the affeetion were found on the tongues, lips and feet of the animals attaeked.

In the ease of the swine at Ballysax vesieular lesions on the lips and feet were exhibited. The animals were in a distressful condition, and at the time of slaughter the horny parts of the feet of some of them had sloughed off. (Vide Figures VII. to XII.)

The eleansing and disinfeetion at infeeted plaees in this Group, as in other eases, was (as far as was praeticable) earried out in a thorough manner, under the supervision of the Department's Inspectors.

The proximity of the Kildare outbreaks to the extensive Curragh grazing lands, on whieh thousands of sheep were grazing at the time, was a eonstant souree of anxiety to the Department. These sheep were plaeed under speeial restrietions, and Inspeetors were eontinually engaged in inspeeting them, as well as other animals in the neighbourhood, fearing the possibility of further extensions of the outbreak. Fortunately, however, the disease did not extend to the Curragh grazing lands.

As in the ease of other outbreaks of Foot-and-Mouth Disease, a number of theories were put forward respeeting the manner in whieh disease was originally eonveyed to Ballysax. These on investigation were proved to be unfounded. One of these theories, as related to the Department, was to the effeet that the swine at Ballysax had been bedded with straw which reaehed the Curragh Camp as paeking material for eertain goods, and it was assumed that this straw might be of foreign origin. It was ascertained that no straw from the Camp was brought to Ballysax ; but from enquiries which were instituted it would appear that the swine had been fed on swill from the Camp, and from this faet the rumour as to the straw would seem to have gained currency. Further, it was learned that any vegetables mixed in the swill were of Irish origin. A number of other persons around the distriet had also fed swine on swill from the Curragh Camp. These animals were earefully examined, without the diseovery of any traee of disease.

From Ballysax the disease was evidently eonveyed to Kinneagh and the adjoining infeeted plaee at Sunnyhill. Passing from the Ballysax direetion there are footpaths through Kinneagh, whieh were eonstantly used by pedestrians, and it is

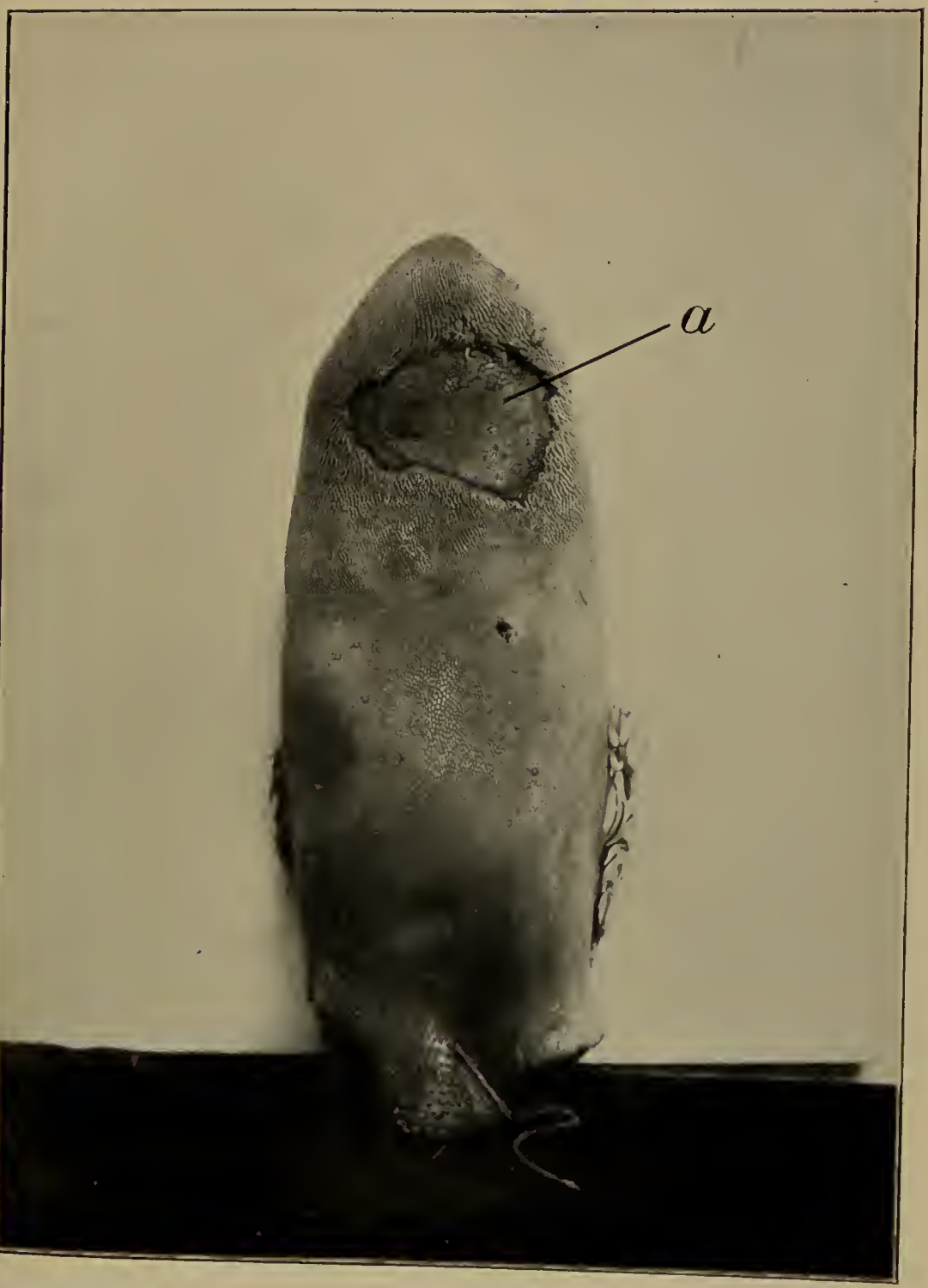


FIGURE VII.—Part of tongue of bullock with Foot-and-Mouth Disease.
a. Erosion of mucous membrane, following rupture of vesicle.
(GROUP No. 3.)



FIGURE VIII.—Tongue of bullock with Foot-and-Mouth Disease. *a. a. a.* Erosions of mucous membrane after rupture of vesicles.

FIGURE IX.—Upper lip, dental pad, and part of palate of bullock with Foot-and-Mouth Disease. *a.* Erosion of skin on border of lip after rupture of vesicle. *b.* Recently ruptured vesicle on inner surface of lip, with epithelium still adhering.

(GROUP No. 3.)

probable that the infection was conveyed to Kinneagh in this manner before the discovery of the Ballysax outbreak.

There is nothing to show how the disease was conveyed to Lugatryna and Dunlavin Upper.

GROUP No. 4.

Number of infected places, ... 37

Number of animals affected with Foot-and-Mouth Disease, ... 112 Cattle, 1 Swine.

Number of animals (including diseased) Slaughtered, 426 Cattle, 315 Sheep, 19 Swine, 9 Goats.

The initial case of Foot-and-Mouth Disease in this Group occurred in the town of Mullingar. On the 18th October a local veterinary surgeon reported to the Department that he suspected the existence of the disease in Mullingar, and on the same date outbreaks were confirmed by the Department's Veterinary Inspectors on five different places in and adjoining the town. On the following day six other outbreaks were confirmed in the neighbourhood, and the disease spread with more or less rapidity until the 7th November, when the thirty-seventh outbreak was reached, but by that time the disease was well under control.

All of the places infected were within a radius of about 4 miles from Mullingar, and, with the exception of one or two instances, the disease did not spread beyond a mile from the town. Owing, however, to the rapidity with which the infection did extend, these outbreaks were calculated to cause greater alarm than any of the preceding ones in Ireland during the year.

It is probable that the disease existed for a few days about Mullingar before being actually recognised and brought under official notice. The history of some of the earlier cases in the vicinity of the town, as subsequently ascertained, and the condition of the lesions observed on certain of the affected cattle, tend to corroborate this view.

The rapid manner in which the disease extended in the earlier days of its invasion is attributable to the fact that residents in Mullingar, owning small lots of cattle, including milch cows, moved some of them daily from the byres situated in the town, along the public streets to the town parks, where the animals grazed. By these means, cattle housed in different portions of the town were in frequent contact with each other, or passed over the thoroughfares about the same time each day; and it has been ascertained that some of the animals so moved were actually at the time the subject of the disease in its early stages. The grazing lands were in a number of instances contiguous to each other, and the infection spread from herd to herd owing to this cause also, and possibly in some cases by the movement of persons from places where the affection was subsequently found to exist.

With one exception it was considered necessary in the case of each infected place to slaughter all susceptible animals thereon —non-affected as well as diseased—and also certain other animals in proximity to some of the infected places.

A special feature of this outbreak was the number of different lots of cattle which it was ascertained had been moved to other districts from the neighbourhood of Mullingar immediately before the outbreak was discovered. These were, however, followed up, examined, and placed under restrictions. It was considered necessary as a precautionary measure to slaughter certain of these animals which, it was ascertained, had been moved from the immediate vicinity of infected places about Mullingar. In all instances, however, no disease was discovered amongst these cattle.

An unusually large staff of Inspectors was employed in connection with these outbreaks, owing to the number of infected places which required to be dealt with at the same time, and the extended area in which farm-to-farm inspections of live-stock were made. During these latter operations seven of the outbreaks were discovered by the Veterinary Inspectors.

Taken as a whole the disease may be regarded as of a severe type. The characteristic appearances of the malady were present in the case of all the affected cattle, and were especially noticeable where milch cows were attacked. The constitutional symptoms were frequently of an aggravated character. A large number of the animals exhibited lesions on the feet as well as on the tongues and lips, and, in the case of milch cows, on the udders and teats. In some instances the lesions were abundant on the parts concerned. (Vide Figure XIII.)

None of the sheep on the infected places contracted the disease.

The cleansing and disinfection of the infected places was carried out as thoroughly as possible by the Veterinary Inspection Staff.

No evidence has been obtained which would show how the disease was conveyed in the first instance to Mullingar, but there is no doubt that all the 37 outbreaks were directly or indirectly connected with one another.

In addition to the live-stock concerned in the outbreaks of Foot-and-Mouth Disease, no less than 378 animals suspected of the disease in different parts of the country came under notice of the Department's Veterinary officers within the period from 1st July to 1st March. On examination and investigation all of these animals proved to be free from Foot-and-Mouth Disease. The large majority of these suspected cases were easy of diagnosis, but difficulties arose in some instances, and it may be interesting here to refer to a few cases of this kind discovered at or in connection with the cattle shipping ports.

On the 28th November a large consignment of store cattle were being inspected at Dublin port preparatory to their shipment to Dundee. Among these animals were a lot of 80 bullocks which for some months previously had grazed together



FIGURES X., XI., and XII.—Back view of feet of swine affected with Foot and-Mouth Disease. *a. a. a.* Ruptured vesicles.

(GROUP No. 3.)

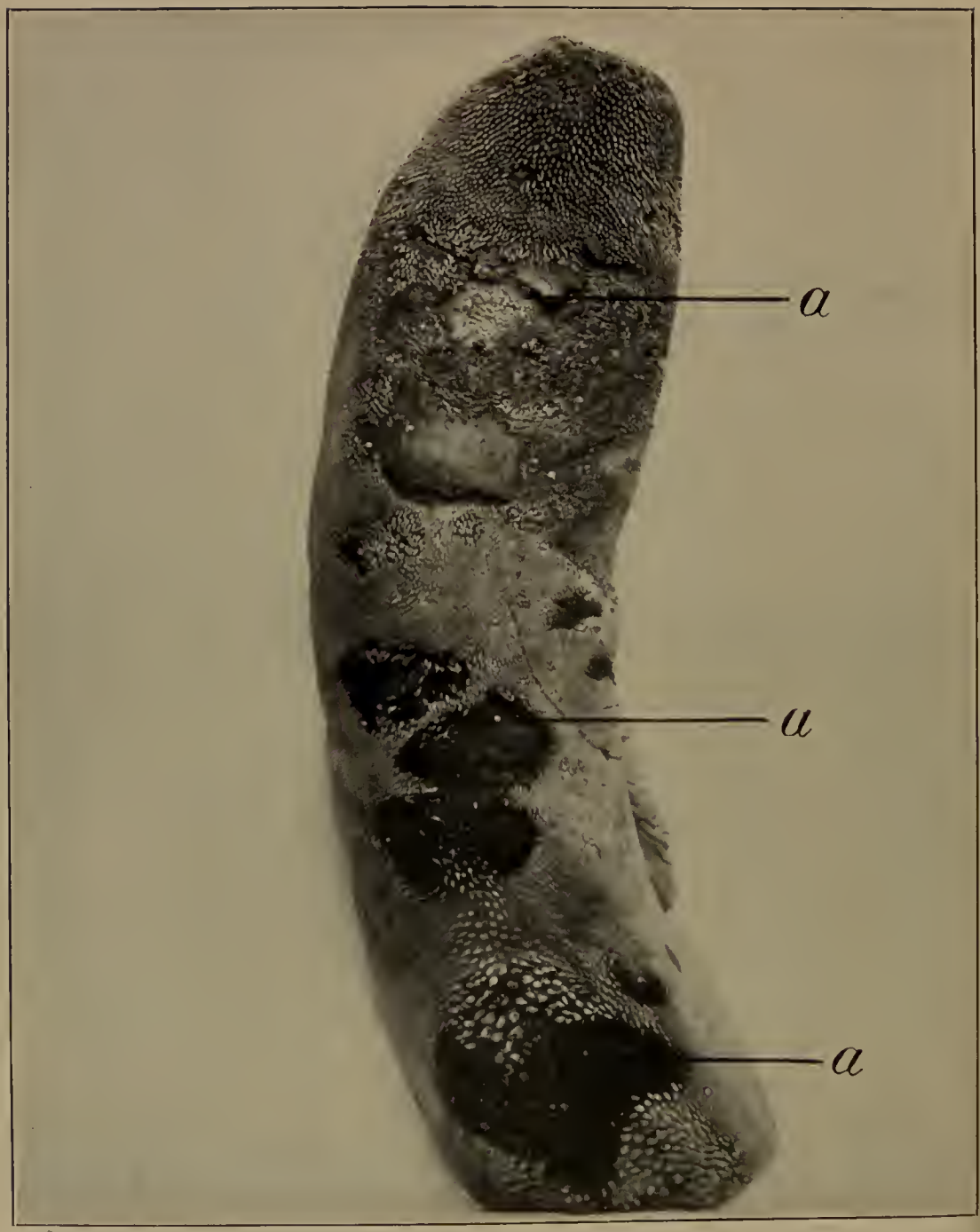


FIGURE XIII.—Tongue of cow with Foot-and-Mouth Disease. *a. a. a.* Extensive erosions of mucous membrane following rupture of vesicle.
(GROUP No. 4.)

on lands in the County of Meath. On being "mouthed," a lesion was discovered on the surface (near the tip) of the tongue of a bullock. The mucous membrane had been removed to the extent of about an inch square, and, when discovered, the abraded surface was in a semi-healed condition. There were no feet lesions. Except for the condition of the tongue the animal was in a perfectly normal state of health. The abrasion on the tongue would not have been discovered had not the bullock's mouth been opened during the process of examination. The appearance of the tongue simulated that which might possibly result in the case of an animal which was affected with Foot-and-Mouth Disease and had passed the infective stage of that malady. A searching examination was made of the remaining bullocks of the lot, and of other animals in the inspection yard, but nothing further of a suspicious character was discovered.

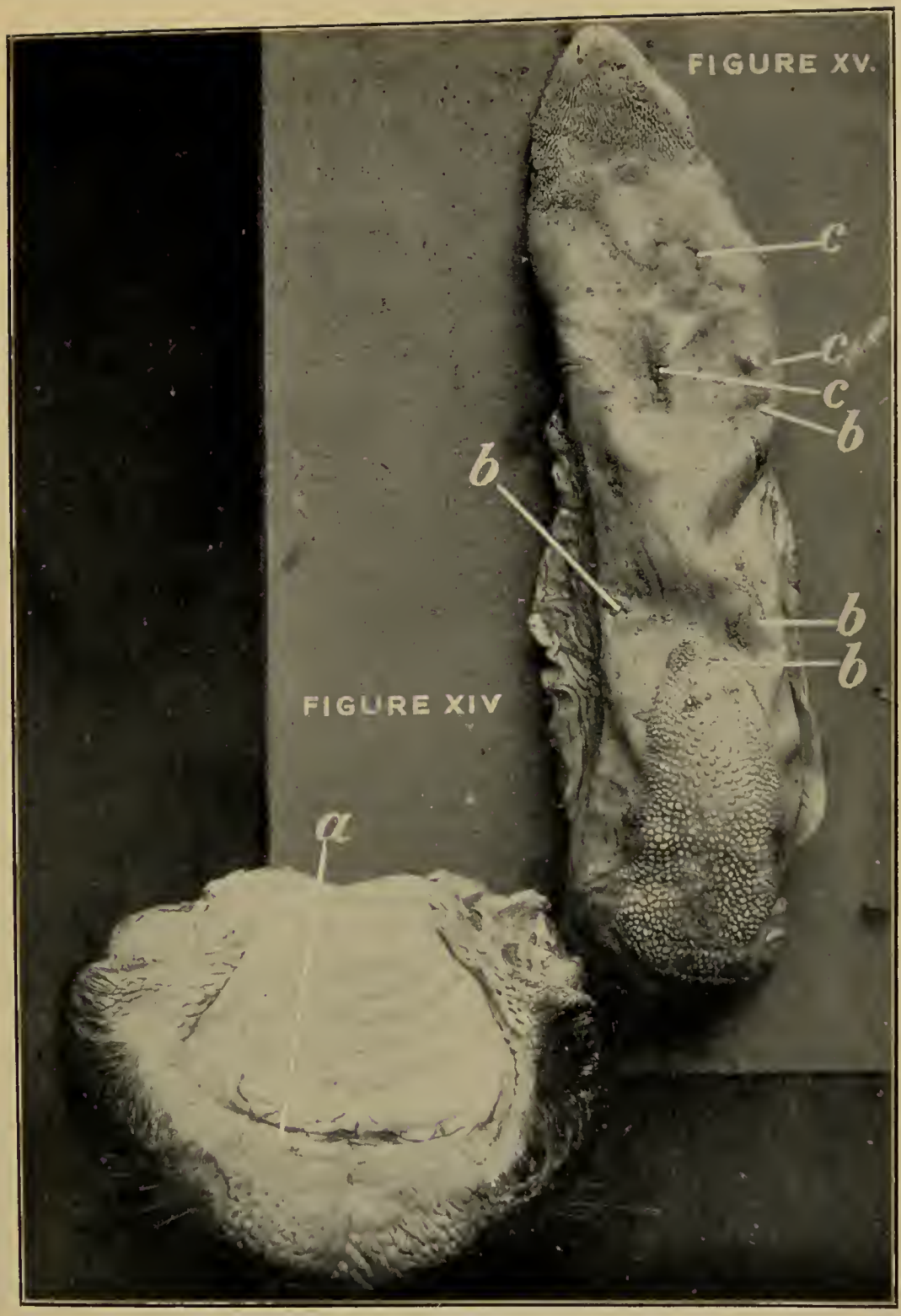
No case of Foot-and-Mouth Disease had occurred in the district from which the bullocks had been moved prior to their arrival at the port for shipment, and it would appear that nothing abnormal had previously been observed in respect to this animal, or other animals comprising the lot. The length of time the lesion must have existed, the period the cattle had grazed together, and the absolute freedom of all the companions of the bullock from any appearance of disease whatever, strongly discredited the suspicion that the abrasion observed on the tongue of this otherwise healthy animal was due to Foot-and-Mouth Disease, and, upon a decision being arrived at that the condition had arisen from a cause other than Foot-and-Mouth Disease, and the owner having expressed his willingness to slaughter the bullock and hand over its tongue to the Department, the cargo of 486 cattle was allowed to proceed to Dundee. Immediate steps were taken, however, to inspect all the animals in or about the farm in the County of Meath from which the bullock came, but no appearance of disease was found, and nothing was elicited which would tend to indicate that any sickness for which Foot-and-Mouth Disease might be mistaken had occurred in the vicinity.

Having regard to the fact that the in-contact animals were being shipped to Great Britain, it was considered proper to at once apprise the Board of Agriculture and Fisheries of the details of the case, and, if desired by the Board, to forward the tongue of the bullock for examination by their Veterinary Officers. On this being done the Board requested the tongue to be sent to them, and on its receipt they telegraphed to the Department to the effect that their Chief Veterinary Officer was of opinion that the animal to which the tongue belonged suffered from Foot-and-Mouth Disease a month or two previously, that the lesion could have arisen from no other disease, and, that acute lesions of the disease might occur in cattle in contact with the bullock in question. The cattle on arrival at Dundee were consequently detained for a prolonged period in

quarantine, in anticipation of disease appearing among them. The animals, however, remained healthy, being subsequently distributed to farms in Scotland, and no case of Foot-and-Mouth Disease occurred in that part of Meath from which the 80 bullocks had come.

A case somewhat identical in character to the above occurred on the 30th November, also at the port of Dublin. During the examination of animals prior to their shipment to Manchester, a heifer belonging to a lot of 46 cattle was found to exhibit a healing abrasion on the upper surface of her tongue, near its tip. The lesion was almost similar in appearance and in age to that found in the case of the bullock already referred to. The mucous membrane had been removed, and the lesion was in a semi-healed state and not unlike that which might arise from Foot-and-Mouth Disease. The heifer was otherwise in normal health. All of the animals comprising the lot about to be shipped were critically examined and found perfectly healthy. The heifer, with others brought forward for shipment on the occasion, had been purchased a couple of days previously from a cattle salesmaster, and had grazed for several months on his farm in the County of Meath, at a place distant many miles from the lands from which the bullock referred to in the preceding case came. It was not considered that the case was one of Foot-and-Mouth Disease, but having regard to the fact that the Department were in correspondence with the Board of Agriculture and Fisheries respecting the somewhat similar case discovered at the port two days previously, it was determined to slaughter the heifer and to prohibit the shipment of the in-contact animals. These animals were accordingly detained and isolated. The heifer was slaughtered and her tongue kept available for examination by the Board's Veterinary officers, if they so desired. The facts of this case were communicated to the Board, who sent one of their Veterinary Inspectors to Dublin. He examined the isolated animals and the tongue of the slaughtered heifer on the 2nd December. He found no disease among the cattle, but expressed the opinion that the heifer to which the tongue had belonged suffered from Foot-and-Mouth Disease, and, at his request the tongue was despatched to the Chief Veterinary Officer of the Board for his examination. Meanwhile, immediate and exhaustive inquiries had been made at and about the farm in the County of Meath from which the heifer and other animals had been moved, first to the Dublin market, and then to the port for shipment. A large number of cattle with which the heifer and her companions could have come in contact were critically examined, and full inquiries instituted, but nothing whatever was ascertained which would at all support the conclusion arrived at by the officials of the Board of Agriculture as to the existence of Foot-and-Mouth Disease.

In order to support the view taken by the Department's officers in connection with this case, the tongue of the heifer was shown to Professor Mettam, M.R.C.V.S., who, whilst unable



(NEWRY-BIRKENHEAD CASE.)

Dental pad and lip of bullock and tongue of same bullock shipped from Newry to Birkenhead on 3rd December, 1912.

FIGURE XIV.—*a*. Part of dental pad and lip from which a thin layer of superficial epithelium has been removed.

FIGURE XV.—*b*. Brown-coloured markings (centres from which layers of superficial epithelium commence to peel off). *c*. Superficial epithelium commencing to peel off tongue.

(Tongue shrunken and distorted owing to preservative.)



(NEWRY-BIRKENHEAD CASE.)

Portion of the mouth of a heifer shipped from Newry to Birkenhead on 3rd December, 1912.

FIGURE XVI.—*a*. Part of dental pad from which a thin layer of superficial epithelium has been removed.

to say that the condition exhibited did not arise from contagious Foot-and-Mouth Disease, considered it might be due to Pseudo-Foot-and-Mouth Disease, having regard to the history of the case, of which he was informed.

No appearance of the disease occurred among the isolated in-contact animals. They were kept under daily observation until the 19th December, when the Board of Agriculture and Fisheries intimated that they no longer objected to their shipment to Great Britain. The cattle on the farm in Meath, where this heifer came from, were placed under restrictions, and inspections of them were subsequently made, but no disease occurred among them.

The lesions as observed in the two foregoing cases were not in an early or acute stage. As already mentioned, they were semi-healed, and consequently the diagnosis was much more difficult than if they were seen in their early development. They might readily be mistaken for lesions of Foot-and-Mouth Disease, especially in the absence of the histories of the cases—but the circumstances strongly indicated that they resulted from a form of stomatitis distinct in character from Foot-and-Mouth Disease. Other cases of the kind were on a later date discovered at Belfast port, when an opportunity was afforded of observing the development of the lesions, with the result, that no doubt remained as to the malady being entirely different from Foot-and-Mouth Disease. The circumstances are as follows :—

On the 14th February a lot of 87 cattle arrived at the port of Belfast from the County of Tyrone. They were intended for shipment to Ayr. On veterinary examination being made, however, seven of these animals were found to suffer from stomatitis, the lesions of which were abundant on the muzzles, outer and inner parts of the lips, and on the tongues of the cattle. On the upper surface of the tongues of three of these cattle, near the tips, large patches were observable. These were covered with necrosed tissue (entirely different from vesicles). The necrosed tissue was easily removed, and where this was done a reddish coloured surface was exposed. There were no feet lesions, and the animals exhibited no constitutional symptoms of illness. The Department's Portal Supervisor at Belfast, who considered the animals were not affected with Foot-and-Mouth Disease, detained the entire lot of 87 cattle and asked for instructions. One of the Department's senior Veterinary Inspectors, who was specially familiar with Foot-and-Mouth Disease during the recent outbreaks, was at once despatched to Belfast, and he corroborated the opinion of the Portal Supervisor as to the absence of Foot-and-Mouth Disease.

As the animals were intended for shipment to Scotland, the Board of Agriculture and Fisheries were communicated with, and their Superintending Veterinary Inspector examined the cattle two days subsequently. I was present during this examination. The muzzles, lips and tongues of the animals

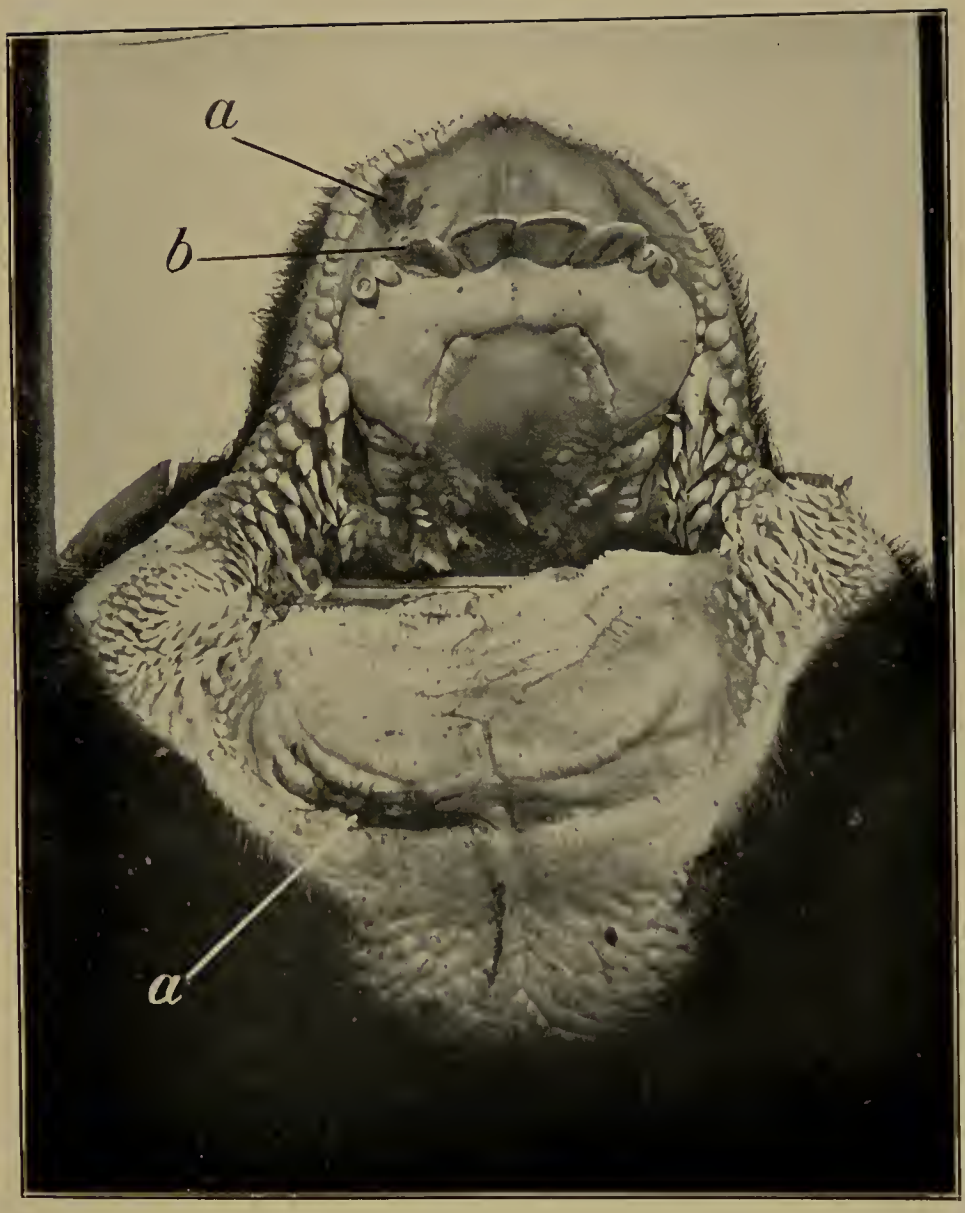
still exhibited distinct lesions of stomatitis. The necrotic tissue which covered the larger patches on the tongues of the three cattle had been removed, and the abrasions produced were fast healing, showing lesions practically similar to those observed on the tongues of the County Meath cattle referred to in the two preceding cases, although the healing process had not at that time advanced quite so far as was observed in the Meath cases. The remaining 80 cattle forming the lot were examined, with negative results. The 87 cattle had been kept for weeks on farms in the County of Tyrone, immediately before being moved to Belfast. All animals remaining on these farms, or which could have come in contact with animals thereon, were without delay critically examined and found to be healthy.

After being communicated with by their Superintending Veterinary Inspector, consequent on his examination of the cattle in Belfast, the Board of Agriculture and Fisheries informed the Department to the effect that they had no objection to the exportation of the animals. The Department, however, decided to defer shipment, and kept the cattle under observation. The lesions healed in a comparatively short time and more rapidly than is usual in Foot-and-Mouth Disease. The malady did not extend to any of the other cattle in the lot.

Measures were taken by the Department, under strict conditions of isolation, with a view to inoculate other cattle with material taken direct from the affected animals, but with negative results. This disease is possibly of a fungoid origin.

On the 3rd of December the s.s. " Iveagh " sailed from Newry for Birkenhead, having on board 73 cattle, 143 sheep, and 525 swine. All of these animals prior to shipment had been under the observation of the Veterinary Inspector at Newry for a considerable time. Nothing was noticed amiss with any of them, and accordingly the Veterinary Inspector issued the requisite certificate for the shipment of the live-stock to Birkenhead. These animals were all intended for immediate slaughter and in accordance with the then existing arrangement none of them were "mouthed " when being inspected. On the 4th December the Board of Agriculture and Fisheries informed the Department by telegram that their Veterinary Inspector at Birkenhead had found one of the cattle belonging to this cargo to be affected with Foot-and-Mouth Disease, and in a further communication on the following day the Board stated that their Veterinary Inspector reported the discovery of four more cattle affected with the disease among the cargo, but that the sheep and swine were all healthy.

On receipt of the first intimation from the Board, immediate steps were taken to locate the places where each of the 73 cattle came from before being shipped from Newry. These places, which are situated in the Counties of Armagh, Monaghan and Tyrone, were quickly located. All animals remaining on them were found free from disease, but, as a matter of precaution, their movements were restricted by service of special notices.



(NEWRY-BIRKENHEAD CASE.)

Portion of the mouth of a bullock shipped from Newry to Birkenhead on 3rd December, 1912.

FIGURE XVII.—*a*. *a*. Injuries to lips caused by broken tooth. *b*. Broken tooth opposite injury to lip.



(NEWRY-BIRKENHEAD CASE.)

Portion of the mouth of a bullock shipped from Newry to Birkenhead on 3rd December, 1912.

FIGURE XVIII.—*a*. Part of dental pad and lip from which a thin layer of superficial epithelium has been removed.

In the communications from the Board some misapprehension appears to have at first existed as to the ownership of the five cattle reported to be affected with the disease, but subsequently it was learned that all of these animals belonged to one dealer, who shipped a total number of 27 cattle to Birkenhead on the occasion, and it was then ascertained that four of the affected cattle, including the animal first detected, were obtained from two farms in the County of Armagh, and the remaining animal from a farm in the County of Tyrone.

Immediately after information was received from the Board of Agriculture and Fisheries as to detection of the disease at Birkenhead, one of the Department's senior Veterinary Inspectors was instructed to proceed at once to London and examine the lesions of disease found to exist in the case of the animal which was first detected at Birkenhead, it having been learned that the parts of the animal on which these lesions were situated had been forwarded to the Board's offices at London, and, on reaching the Board's offices, the Inspector was shown certain conditions on the tongue (which had arrived from Birkenhead) said to be lesions of Foot-and-Mouth Disease. The portions of the remaining four cattle regarded as exhibiting appearances of the disease had not at the time reached London, but, at the request of the Department, the parts showing the lesions of the first case discovered, and, subsequently of the remaining four cases, were forwarded by the Board of Agriculture and Fisheries to the Department for examination. These consisted of the tongue and upper lip (with gum attached) of the first animal detected at Birkenhead, and the upper and lower lips (with gums attached) of the other four cattle. On examination at the Department it was found that the lesions exhibited in each case were not those of Foot-and-Mouth Disease. The tongue (of the first animal detected at Birkenhead) showed elevations and peeling off of superficial epithelium, but no exposure of the corium, such as occurs in Foot-and-Mouth Disease. (Vide Figures XIV. and XV.) A like condition was more or less observable on the lips and gums forwarded (except in the case of one set of lips where the abnormalities were evidently due to injuries produced by the animals' teeth). (Vide Figures XVI. to XIX.)

Meantime, the places in the Counties of Armagh and Tyrone where the 27 cattle belonging to the dealer had been obtained, were again visited by the Department's Veterinary Inspectors, and, on a farm near the town of Armagh, where one of the five cattle said to have been affected with Foot-and-Mouth Disease had come from, it was discovered that in the mouths of four of the seven cattle grazing thereon patches of superficial epithelium were peeling off, presenting conditions practically identical with those regarded as Foot-and-Mouth Disease at Birkenhead. The lesions were seen in different stages. Brown-coloured markings first appeared on the surface of the tongue, and from these markings thin layers of superficial epithelium peeled off in patches, but no vesicles were formed at any time, and no

soreness of the tongues or other parts of the mouths was noticeable. (It was ultimately observed that the superficial layer of epithelium completely peeled off the tongues of the animals.) No feet lesions were present. There was a complete absence of any constitutional disturbance, and the animals appeared to be in no way inconvenienced by this trifling ailment. Four cattle from the farm in question had been shipped on the occasion to Birkenhead. One of these four animals was originally bought from another farmer in the district, and it was discovered that on this man's land also, this peculiar condition of the mouth existed among his cattle.

There were strong grounds to conclude that this ailment, although not being Foot-and-Mouth Disease, was of a contagious character, and in order that further corroborative evidence might be obtained to negative the possibility of it being Foot-and-Mouth Disease, experiments on other animals (including swine) susceptible of Foot-and-Mouth Disease with material from the mouths of the affected cattle were decided on. In these experiments Professor Mettam, M.R.C.V.S., co-operated. (Vide report on the experiments, page 68). These experiments produced, in the mouths of the cattle inoculated, conditions similar to those described above as occurring on the farm near Armagh, but no lesions of Foot-and-Mouth Disease resulted, nor were there any constitutional symptoms of illness. The actual organism causing this condition in the mouths of the cattle was not discovered, but experiments with a view to its discovery are being continued.

Foot-and-Mouth Disease is an eruptive fever characterised by the production of vesicles, and it is important here to emphasize the fact that no fever existed and no vesicles were present in the case of the naturally infected animals, nor in those infected by artificial means on the farm near Armagh.

The existence of this ailment among cattle in the County of Armagh, and its identity with the condition observed in the animals said to have been affected with Foot-and-Mouth Disease at Birkenhead, was brought under notice of the Board of Agriculture and Fisheries, who were invited to send one of their Veterinary officers to Armagh to investigate the subject on the spot. As a result, one of the Board's principal Veterinary Inspectors arrived at Armagh on the 1st January, and after investigation he concurred in the views of the Department's Veterinary officials that the ailment in question was not Foot-and-Mouth Disease.

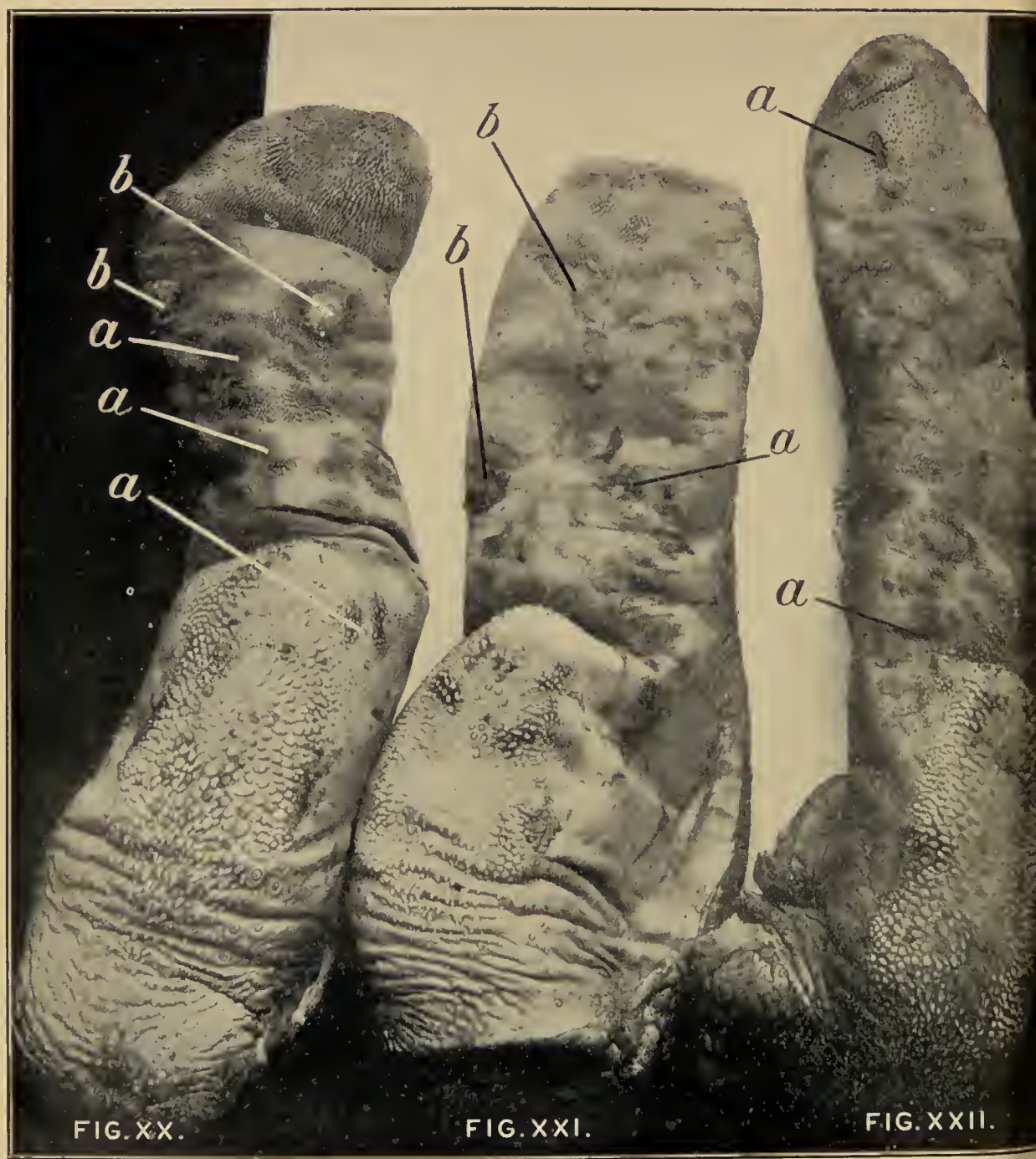
Owing to the prohibition of the exportation of cattle from the port of Derry, consequent on the supposed discovery of Foot-and-Mouth Disease among animals at Birkenhead, cattle intended for shipment alive from Derry were slaughtered at the public abattoir in that city, and their carcases, as well as offal, forwarded to Glasgow. On the 10th December certain tongues of cattle slaughtered in these circumstances were shipped from Derry to Glasgow, and on the 12th of same month the Board of Agri



(NEWRY-BIRKENHEAD CASE.)

Portion of the mouth of a bullock shipped from Newry to Birkenhead on 3rd December, 1912.

FIGURE XIX.—*a*. Part of dental pad and lip from which a thin layer of superficial epithelium has been removed.



(DERRY-GLASGOW CASES.)

Tongues of cattle slaughtered at Londonderry and shipped to Glasgow on 10th December, 191

FIGURES XX., XXI., and XXII.—*a*. Brown coloured markings (centres from which layers o superficial epithelium commence to peel off). *b*. Superficial epithelium commencin to peel off.

(Tongues shrunken and distorted owing to preservative.)

culture and Fisheries telegraphed to the Department that their Veterinary Inspector at Glasgow was sending to their laboratory "three heads of Irish cattle brought over dead, apparently recently suffering from Foot-and-Mouth Disease." A further telegram was received from the Board on the following day in reference to these heads, to the effect that their Chief Veterinary Officer was of opinion that the lesions were those of Foot-and-Mouth Disease. On receipt of the first of these telegrams immediate steps were taken to locate the farms from which the three animals as well as 90 other cattle came, it having been ascertained that all of them belonged to the same consignment and were slaughtered at Derry. The 93 cattle, it was discovered, had been kept on several farms in the Counties of Derry, Fermanagh and Leitrim, and these were located without delay, but it was impossible, owing to the absence of any information as to which cattle of the lot the three tongues actually belonged to, to locate definitely the place or places from which the three animals had been taken, but they had been moved from some of the farms located. Searching enquiries were at once made as to the possible existence of Foot-and-Mouth Disease on any of these places, or in the neighbourhood of same, and a large number of animals were examined on the lands, but with a negative result.

At the request of the Department, the Board of Agriculture and Fisheries forwarded to Dublin the three tongues (with parts of jaws) which had been received from Glasgow. On arrival the three tongues and such parts of the lips as remained were examined and found not to exhibit lesions of Foot-and-Mouth Disease. The conditions on the tongues were identical with those observed in the case of the cattle shipped from Newry to Birkenhead on the 3rd December, and with the affected animals in the County of Armagh, as already referred to. (Vide Figures XX. to XXIV.)

The lesions observable on the tongues and lips of the Newry-Birkenhead and Derry-Glasgow cases showed characteristics entirely different from those seen on the tongues of the two cattle from the County of Meath slaughtered at the port of Dublin and mentioned in the preceding cases.

D. S. Prentice.

APPENDIX B.

Reports on Experiments conducted in connection with the suspected outbreak of Disease in County Armagh.

In connection with the condition observed in County Armagh (see pages 37 and 64), and which is identical with that found to exist on the tongues, gums and lips of the cattle shipped from Newry to Birkenhead, and the heads of cattle forwarded from Londonderry to Glasgow, it was deemed desirable to demonstrate by experiments that the affection concerned was not Foot-and-Mouth Disease. These experiments commenced on the 17th December, and were carried out principally by Mr. Norris, M.R.C.V.S., with the co-operation of Professor Mettam.

(1) *Preliminary Report by Professor Mettam.*

By instruction of Mr. Gill, Secretary to the Department of Agriculture and Technical Instruction for Ireland, I, on 16th December, accompanied Mr. Prentice to Armagh, and on the morning of the 17th examined a number (seven) of animals on Mr. Baxter's farm at Luggyvallen, Armagh. These animals had been in contact with an animal seized at Birkenhead and declared infected with Foot-and-Mouth Disease. I found to all appearances the animals to be in good health, they were feeding and thriving, there was no lameness, no salivation, nothing to attract attention. The animals were "mouthed." Five of the animals showed more or less loss of epithelium from the tongue or the upper gum or from both. The epithelial loss was quite superficial, being removed in flakes, which were of a dirty yellow-brown colour. The epithelium could be removed readily by the finger-nail. The flakes were perforated with minute apertures, through which the papillæ of the tongue had passed. There was no soreness of the tongue or gums. The corium or connective tissue was not exposed. There was no congestion. The temperatures of all the animals were taken and found to be normal. I do not hesitate to say these animals are not infected with Foot-and-Mouth Disease, and since the first examination I have seen and examined these animals on three further occasions, and the subsequent examinations confirm the opinion formed on the first inspection.

I also examined, and have re-examined, four animals belonging to Mr. Lynas at Ballygassoon, affected with a similar condition of the lining of the mouth. These animals are in the best of health, feeding and thriving. There is no salivation, no lameness, no elevation in temperature, no depression. These animals are certainly not infected with Foot-and-Mouth Disease.

Further, the above opinion has been confirmed by certain experiments which have been carried out, details of which will be supplied later and when completed. (The experiments have been made upon young cattle and swine. Similar experiments are now proceeding in sheep. The condition of the mouth has been reproduced in every detail, and there has

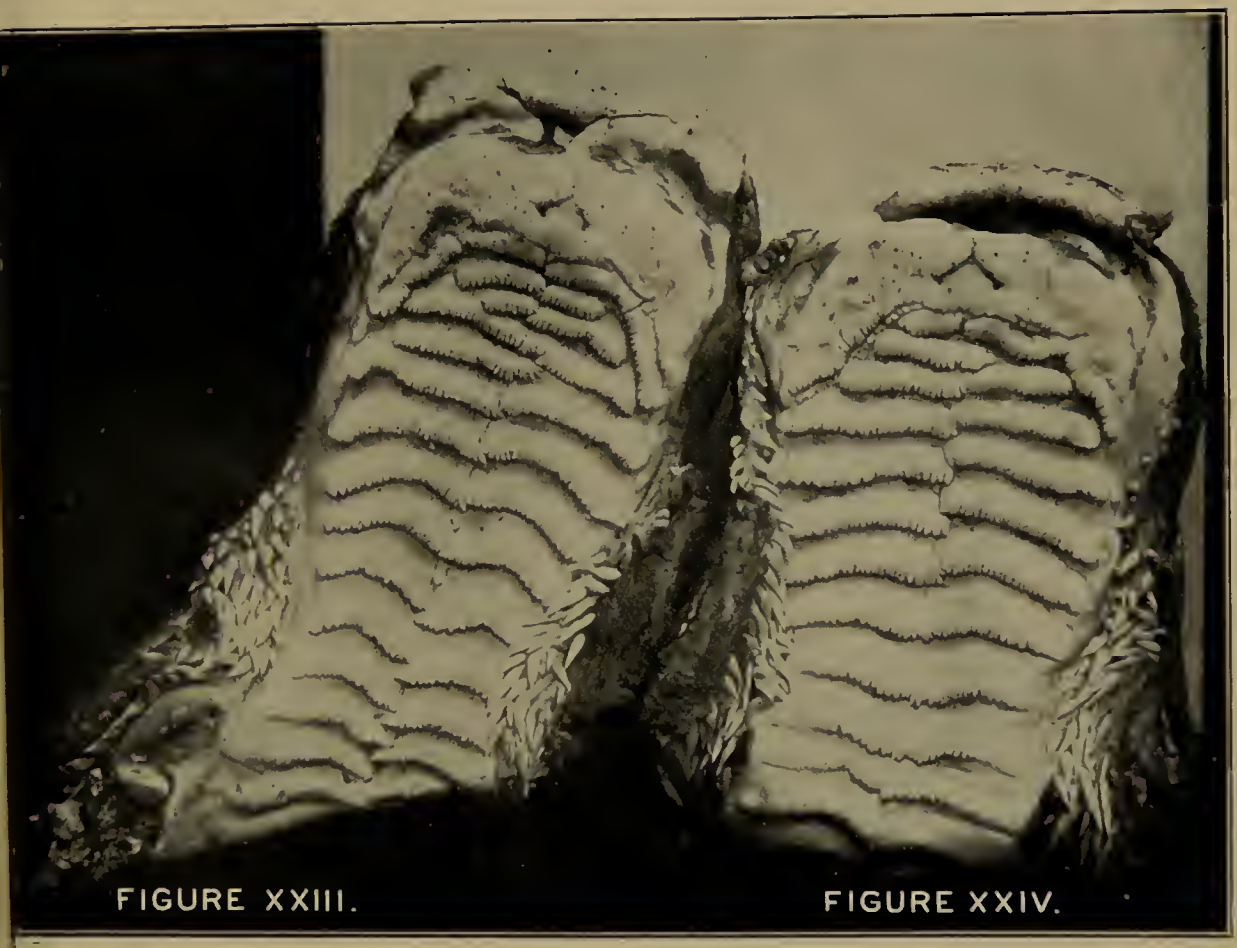


FIGURE XXIII. FIGURE XXIV.

(DERRY-GLASGOW CASES.)

FIGURES XXIII. and XXIV.—Dental pads and portions of palates and lips of two cattle slaughtered at Londonderry and sent to Glasgow on 10th December, 1912. (The lips have been partly cut away in process of dressing.) The parts are devoid of Foot-and-Mouth Disease lesions.

been no constitutional disturbanee, and nothing developed suggesting that the infection is Foot-and-Mouth Disease, not even the produetion of the vesieles).

I have also examined the speeimens forwarded to the Department—tongue and lips of one animal, and subsequently the lips of four animals from Birkenhead—and in my opinion the eondition found is precisely similar to that found in the animals examined in Armagh. In one set of lips, however, the lesions observed were injuries due to the teeth.

(2) *Report by Professor Mettam and Mr. Norris.*

Nature of the Disease.

Before deseribing the experiments it might perhaps be well to briefly give an outline of the lesions and nature of the disease met with in County Armagh.

The lesions appear on the mucous membrane of the lips, the dental pad, and on the tongue. In no case have lesions been seen on other parts of the body, and where they have been extensive upon the lips advaneing towards the hair-bearing skin, they have not extended upon the skin. The lesions are therefore apparently limited to the mueous membrane of the mouth.

The Lips.

Upon the lips exfoliation of the epithelium is observed. The size of the lesion varies as does its outline. It appears very rapidly, generally about the size and shape of a kidney bean, and gradually extends. The superfieial epithelium is lost, and bordering the lesion an irregular ragged fringe of loosened epithelium, outlined by a dark brown line, limits its extent. The lesion may commence anywhere upon the mucous surfaee, but generally near the commissures or angles, and then extends across towards the middle line. It may extend upwards towards the junetion of skin and mucous membrane and even on to the muzzle, the lesion then becoming roughly triangular in outline, but it does not extend upon the skin. It must be emphasized that the loss of epithelium is superficial. The shreds are as thin as eigarette paper. There is no exposure of the eorium or eonnective tissues, there is no pain, tenderness or soreness, or eongestion. Never at any time was any vesicular eruption seen on the lips, merely this superficial epithelial loss and the dark brown line marking the limits of the lesion.

Similar lesions may be observed on the pad, but the exfoliated epithelium appears to be somewhat thieker than that seen on the lips. Exeeptionally, the lip lesion may extend baekwards upon the mueous membrane of the eheek, just within the eommissure or angle of the mouth. In no ease was a typical lesion seen on the mueous membrane of the lower lip.

The Tongue.

The lesions on the tongue commenee as brownish, even dark brown spots, on the mueous membrane, generally circular in

shape, and in size from a threepenny piece to a sixpence. They may arise in any part of the dorsum of the tongue, usually at about the junction of the fixed and free portions of the organ. The brown spot increases in size, and is but slightly elevated above the general level of the mucous membrane. There is no vesicular eruption. There is no fluid beneath the dark spot. The epithelium gives way and is removed in thin flakes perforated with apertures through which the papillae passed. If a number of lesions have developed, they become confluent and then an irregular area or several irregular areas from which the epithelium has been lost may be observed on the same tongue. The lesions generally extend towards the tip. No lesions have been found posterior to the bulbous swelling of the tongue. It also extends laterally but apparently not to the under surface of the tongue. The last epithelium to persist is that covering the large papillae on the dorsum about an inch posterior to the tip of the tongue. The lesion only affects that portion of the tongue carrying horny papillae. The epithelium is easily removed during handling of the tongue; adherent or partially detached flakes may readily be taken away, and they resemble on a small scale pieces of perforated zinc. In time the whole of the dorsum and sides of the tongue lose the horny epithelium, and the tongue becomes remarkably soft and clean, resembling the tongue of a newly-born calf. Before the tongue reaches this condition, however, and before it has lost all the covering epithelium, dirty brown lines somewhat raised, running in different directions, may be seen. These are the remains of the old epithelium at the confluence of the lesions, and sooner or later they are removed. The time required for epithelium to be removed entirely is about from 10 to 14 days, or less. Apparently the tongue may again become re-infected. Cases have been noticed where the brownish spots have re-appeared on a tongue from which the horny epithelium had been removed. The spots evidently were of the same character as those occurring during the primary infection, but they are not so well marked and do not spread to the same degree.

The majority of animals affected are two years old or under, and there is some reason to believe that adult animals are not attacked to the same extent. There are no clinical symptoms. The animals do not salivate. There is no smacking of the lips, soreness of the mouth, nor lameness. To all appearances the animal enjoys normal health. There is no rise of temperature, and the appetite and rumination are in no way interfered with; in fact the condition is only detected when the mouth is opened and examined.

From the nature of the infection—its course and its results—it is apparent that the condition is one of little importance, and that Veterinary Practitioners are seldom or never called in to treat it.

The Experiments.

The infective material used in these experiments was obtained from two separate farms, and, for the purposes of reference, the material from one may be designated virus "X" and that from the other virus "Y." Fortunately ample accommodation for carrying out the experiments was available on one of these farms. The primary object in view was to determine whether the affection observed in the animals in County Armagh was Foot-and-Mouth Disease or not, and, for that purpose, the following experiments were carried out :—

Experiment A.—Four young calves from 4 to 5 months old were, on the 17th December, inoculated in the following manner with Virus X :—

The virus was obtained by scraping the tongues and removing the loosened epithelium by means of a Volkmann's spoon. The material thus obtained was rubbed down in a mortar with sterile normal saline solution. The emulsion obtained was then filtered through ordinary filter paper to remove coarse particles which might block the needles.

Calf 1 received 3 c.c of the emulsion directly into the jugular vein. This animal remained in normal condition until the sixth day after, when a slight superficial lip lesion was noticed. On the eighth day some lesions appeared on the tongue. These lesions in no way resembled those seen in Foot-and-Mouth Disease, but were identical with those described in the earlier part of this report. The lesions progressed over almost the entire mucous surface of the upper lip and on the dorsum of the free portion of the tongue. The animal was slaughtered on the twelfth day for the purpose of obtaining its tongue and upper lip as museum specimens. This animal did not develop the mouth lesions as a result of the intravenous inoculation, but, from repeated manipulation of the mouth by soiled hands subsequent to the inoculation.

Calf 2 received 3 c.c. of the same emulsion as Calf No. 1, directly into the peritoneum. This animal remained in normal condition until 15 days after, when brown spots were distinctly noticeable on the tongue, and lip lesions appeared about the same time and extended on to the dental pad. The lesions in no way resembled Foot-and-Mouth Disease, and by the twenty-fourth day after inoculation the lesions had practically disappeared. Like in the case of Calf 1, the mouth infection doubtless occurred from the handling which the animal was subjected to during the necessary manipulations for examination.

Calf 3 was inoculated by rubbing the emulsion used in Calf No. 1 upon its scarified upper lip and pad. Four days afterwards typical brown lesions appeared on this animal's tongue. Lip lesions appeared on the fifth day. The

lesions progressed in the usual way. The animal was slaughtered on the tenth day after inoculation, to obtain its tongue and lip as museum specimens.

Calf 4. This animal's tongue was scarified on the dorsum and also on the under surface of the organ, and the emulsion rubbed into the scarification wound. Three days afterwards lesions were found on the dorsum of the tongue in the neighbourhood of the scarification wound. Lip lesions appeared a day or two later. The lesions progressed and by the fourteenth day after inoculation the superficial epithelium was completely exfoliated from the tongue and lip. Faint secondary lesions appeared on the tongue afterwards.

No attempt was made to isolate these four calves or keep them separate. They were allowed to freely mix and feed from a common supply. They were frequently handled after other animals suffering from the disease, no precautions being taken to prevent transmission of disease during manipulation, the sole object being to set up the disease in the calves. In no case, however, did anything arise nor was there the remotest suggestion that the condition was Foot-and-Mouth Disease, nor did the lesions produced resemble that affection in any of its salient characteristics.

It having been determined that the disease was inoculable, and that the lesions were confined to the mouth, it was resolved to continue the experiments in other cattle, and in sheep and pigs.

Experiment B.—Two yearling cattle (Nos. 5 and 6) and one pig (No. 1) were, on the 21st December, inoculated by rubbing the upper lip, pad and tongue of each of the cattle, and the palate and tongue of the pig, with sandpaper impregnated with Virus Y. In the case of the two cattle, lesions appeared on the tongues and lips about the fourth day after inoculation. The lesions were characterised by superficial exfoliation of epithelium, and did not resemble Foot-and-Mouth Disease. In the case of the pig no reaction whatever occurred, although the animal was kept under close observation for three weeks afterwards.

Experiment C.—Two yearling cattle (Nos. 7 and 8) and one pig (No. 2) were inoculated on the same day and in the same manner as the animals in Experiment B, with material obtained from the lesions set up in Experimental Calf No. 4 (Virus X). Lesions appeared on the lips and tongues from the third to fifth day in the case of the cattle. These lesions were not those of Foot-and-Mouth Disease, but simply showed superficial loss of epithelium.

In the case of the pig no reaction whatever was shown, although the animal was carefully examined every day for three weeks afterwards.

Experiment D.—Two young sheep (Nos. 1 and 2) were inoculated by having their tongues, lips and palates rubbed with sandpaper saturated in Virus X and Y. In the case of Sheep No. 1 Virus X from Experimental Calf No. 4 was used, and, in the case of Sheep No. 2, Virus Y from Experimental animal No. 5. No reaction whatever was noticed in either of the sheep, although they were kept under observation for 16 days after the date of inoculation.

Experiment E.—As the virus of Foot-and-Mouth Disease is ultra microscopic, and so small that it will pass through a fine porcelain filter, an experiment was made to see if such a filter would retain the virus of "Armagh disease." Accordingly scrapings were taken from lesions of the latter disease (which had already proved to be infective by inoculation), macerated with normal saline solution, and the emulsion passed through a Berkefeld filter. The filtrate thus obtained was then used to inoculate the lips and tongue of Calf No. 9. This animal was kept under daily observation for fourteen days afterwards, but no lesion whatever resulted from the inoculation, thereby proving that although the virus of Foot-and-Mouth Disease is a filter passer, the virus of Armagh disease is not.

It having been proved by the foregoing experiments that the disease was easily transmissible to healthy young bovines by direct inoculation on the mucous membrane of the mouth, further experiments were designed to test the contagiousness of the condition by association of healthy with affected animals.

Experiment F.—Two healthy calves (Nos. 14 and 15) were placed in two separate stalls with two animals (Nos. 17 and 16 respectively) showing lesions of Armagh disease. The healthy and affected animals freely mixed together, and fed from a common supply, every opportunity being given to the healthy animals to contract the disease by association, if such were possible. On the ninth day of the experiment very slight lip lesions appeared in calves Nos. 14 and 15, and persisted up to the twenty-first day, when they had completely disappeared. The lesions were at no time well marked, and no tongue lesions were observed in either animal, although they were kept under observation for three weeks.

Experiment G.—Another experiment was carried out by placing two healthy calves, Nos. 12 and 13, in a field with eight affected animals showing mouth lesions in various stages of development. It should be pointed out that the field on which this experiment was made had been carrying animals affected with Armagh disease for some weeks previously. Typical well-marked lesions of the disease appeared on the lips and tongues of calves Nos. 12 and 13, on the eleventh and twenty-fifth days, respectively, of the

experiment. In reckoning the results of this experiment it must be remembered that it was not a simple "association" experiment of affected and healthy animals; there are additional factors to be considered, in that it was possible that the healthy calves became affected from the previously contaminated pasture, or that the source of infection was in the pasture itself.

Conclusions.

From the above experiments it will be seen that thirteen cattle, two pigs, and two sheep, were inoculated in various ways with the virus of this disease, and that in no case was Foot-and-Mouth Disease set up. It will be observed that all the cattle which re-acted showed typical lesions of the disease found among the cattle in County Armagh, and which were identical with those exhibited by the cattle condemned at Birkenhead.

It is very important to note that no reaction whatever occurred in the sheep or pigs, although these animals are highly susceptible to Foot-and-Mouth Disease. Clearly, these experiments prove that the disease is not Foot-and-Mouth Disease.

An endeavour was made to isolate the causal organism of Armagh disease. From cultures obtained from scrapings of lesions, various organisms were isolated and their pathogenic effect tried on susceptible animals. In all seventeen experiments were carried out. Six of these were with mixed cultures obtained directly from lesions. Nine were cultures of various *fungi* (including an aspergillus), one a culture of a micrococcus and one a culture of a bacillus. The results in all cases were negative.

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